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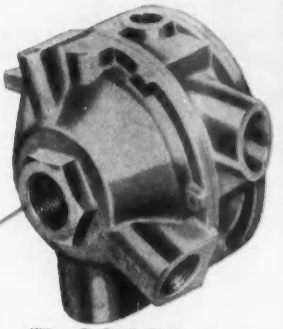
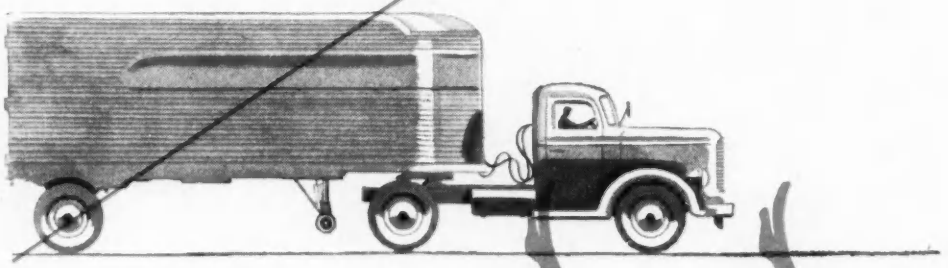
THE FASTEST

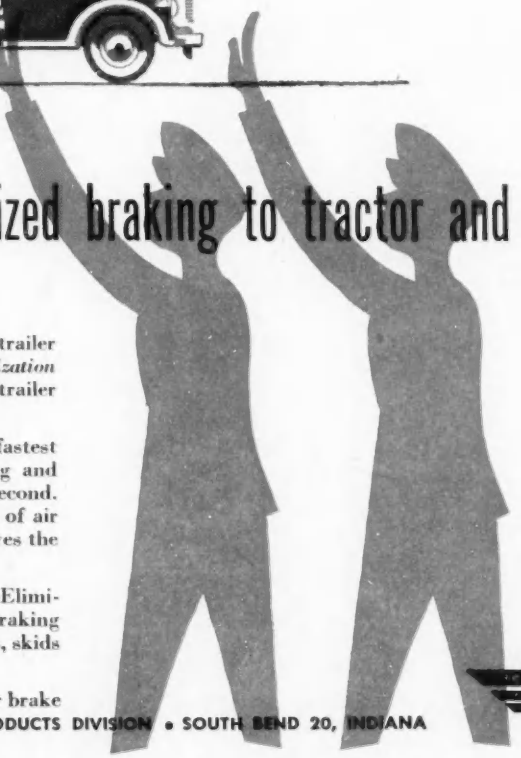


The S.C.V. Valve—a new Bendix B-K Product

Trailer Relay Valve on the market



—brings synchronized braking to tractor and trailer



Regardless of how good the rest of the tractor or trailer braking system may be, brake *balance* and *synchronization* between the two vehicles can be no better than the trailer relay valve that is used.

The new Bendix S.C.V. Trailer Relay Valve is the fastest operating trailer valve on the market. Fast opening and closing valves reduce operating time to the last split-second. Large ports and air passages allow fast, free passage of air to and from the power chambers. Close graduation gives the driver accurate control of brake application.

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THE PRESIDENT'S REPORT For 1945...

by J. M. Crawford,
President,
Society of Automotive Engineers

An Appreciation . . .

As you review the record of SAE for nineteen hundred and forty-five, I hope you read the story between the lines as I do - of the personal sacrifices made and the human understanding exhibited by both the members and the staff in making this one of the Society's great years.

The Society as a whole is indebted to the men and women who have made this record possible. As for me, I want to thank you personally for the privilege of seeing them at work, and for the inspiration that comes to one in a position to fill in the spaces.

--J. M. Crawford

FOR SAE, 1945 was a year of accomplishment, forward planning, and reconversion of aims and facilities from war to the complex needs of an uneasy postwar era. V-J Day marked a reorientation of the vast program of SAE World War II services in which, led by the direct action of SAE war technical committees, every division of the Society participated fully.

Postwar plans, begun with establishment of the Post-War Advisory Committee in 1944, were accelerated by that group throughout last year. Long before V-J Day, postwar programs for critical areas of SAE operation – stimulated or developed by that Committee – were available for Council approval. Council was able to inaugurate in time for immediate postwar functioning the distinguished SAE Technical Board which now directs and supervises all SAE technical committee activity. Scheduled for early action by the Board is consummation of plans for continued peacetime SAE cooperation with the military.

Measurable progress has been made, too, in execution of a plan for regularly financing SAE technical committee services to industry and Government by funds from interested industries and companies.

Progress marks every phase of SAE's service to members and to industry. An all-time high in membership again has been established, with the total increasing each month as 1945 ended. In the face of travel and convention limitations, SAE meetings were kept high in number and quality through a program of Local War Emergency Meetings, stimulated by the National Meetings Committee and executed through the cooperation of the Sections. Total editorial content of the *SAE Journal* was greater during 1945 than 1944 despite paper limitations which existed throughout a large part of the year – and a Special Publications Department was established to supplement the Society's printed periodicals in supplying copies of meet-

ings papers and of technical committee reports.

The Council, during 1945, reaffirmed its belief that the SAE Constitution limits Society activity strictly to the technical and scientific sphere and published pertinent reasons for its agreement with the policy expressed in that limitation. Also, it approved of SAE cosponsorship through the Passenger Car Body Activity with the University of Michigan of a course in body engineering to be established at the University.

Changes in Section Committee operating policy improved materially the potency of this important group as an adviser to the Council. The SAE Placement Department continued its regular services, but gave special attention during the last half of the year to needs of returning veteran members and of other members requiring placement help in the reconversion period.

Technical committee activity continued at a high peak throughout the year, with peacetime and reconversion problems taking the place of direct war projects as the year ended.

The summaries of the work of all SAE groups which appear on following pages record the current scope, strength, hopes and possibilities of that great pool of cooperative technical effort which we know as the Society of Automotive Engineers.

Income, Reserves Maintain Upward Trend Through 1945

During the fiscal year ending Sept. 30, 1945, the Society's income and reserves both reached an all-time high - and the upward trend was maintained during the remaining months of the calendar year.

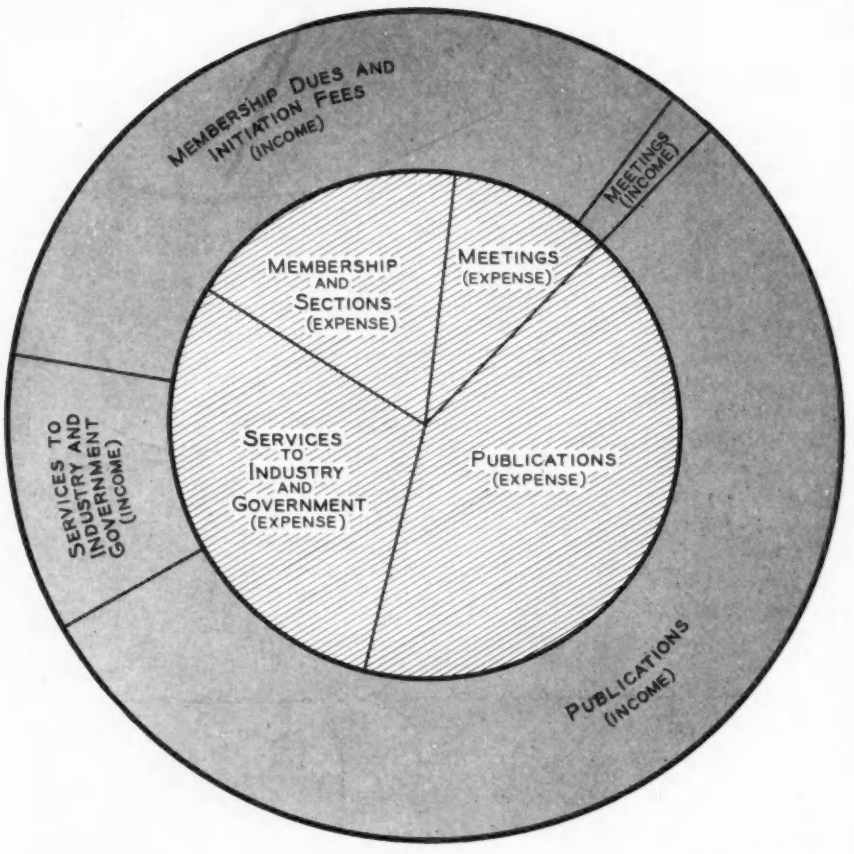
Decision to place on a permanent footing the war-born policy of seeking financial support from industry for all SAE technical committee services to industry and Government resulted from Council approval of a Finance Committee recommendation made in September. Successful consummation of the new policy will release for additional member services such portions of income from dues and advertising as heretofore have been applied to industry and Government services.

The currently favorable financial picture has permitted SAE officers and committees to lay plans, already approved in principle, for expanding the scope of SAE publications, and to contemplate other additional direct-to-member services.

Despite current optimism, however, the Finance Committee, with approval of the Council, has continued the policy of building reserves adequate to insure continued satisfactory operations through intermediate periods of economic stress. In addition, a study of orderly retrenchment procedure has been made in case of some unforeseen necessity.

A contributory retirement plan, which has been under consideration for several years, has now been inaugurated. Its voluntary acceptance by 100% of SAE employees testifies to its value.

An accompanying audited financial statement gives factual evidence of the Society's sound condition.


MEMBERSHIP DUES AND INITIATION FEES (INCOME)
MEETINGS (INCOME)
PUBLICATIONS (INCOME)
SERVICES TO INDUSTRY AND GOVERNMENT (INCOME)
MEMBERSHIP AND SECTIONS (EXPENSE)
MEETINGS (EXPENSE)
PUBLICATIONS (EXPENSE)
SERVICES TO INDUSTRY AND GOVERNMENT (EXPENSE)
SOURCES OF INCOME IN THEIR RATIO TO TOTAL INCOME
ITEMS OF EXPENSE IN THEIR RATIO TO TOTAL EXPENSE

Meetings Ban Handicap Mastered by Section Aid

Dissemination of technical information through presentation of papers and discussions originally designed for SAE National Meetings continued unabated during 1945, despite cancellation of seven National Meetings to comply with a governmental ban on such gatherings.

This essential interchange of war-needed information was maintained without interruption through the expedient of Local War Emergency Meetings until the Government ban was lifted in October. Then reconversion

BALANCE SHEET

At At Sept. 30, 1945

In Agreement with Haskins & Sells Audit

ASSETS	
Cash — Unrestricted	$104,642.46
Cash — SAE War Chest	48,977.99
Cash — Restricted	12,772.67
Notes & Accounts Receivable	22,208.83
Securities	318,404.61*
Accrued Interest on Securities	2,372.99
Inventories	1,071.10
Deposits	475.00
Furniture & Fixtures	1,000.00
Deferred Charges	29,748.49
Total Assets	$541,674.14

LIABILITIES & RESERVES	
Accounts Payable	$ 12,591.77
Members Dues Received in Advance	35,133.65
Deferred Credits	16,157.39
Reserve for Unexpended Contributions	8,145.33
SAE War Chest	48,977.99
Reserve for Retirement Plan Contributions	8,680.45
General Reserve	411,987.56
Total Liabilities & Reserves	$541,674.13

ACCOUNTS RECEIVABLE-MEMBERS DUES	
September 30, 1945	$ 315.00
September 30, 1944	$ 435.00

*Book Value, Market Value 9/30/45, $316,332.00

During 1944-45 a total of $109,549.85 was transferred from the SAE War Chest to General Reserve.

In this period the General Reserve was charged $75,000 in connection with the Retirement Plan, $70,482.89 of which represented premiums for Past Services, the balance of $4,517.11 being credited to Reserve for Retirement Plan Contributions.

General Reserve is charged with payroll adjustments of $17,972.04.

INCOME AND EXPENSE

12 Months Ending Sept. 30, 1945, and comparison with previous period

In Agreement with Haskins & Sells Audit

INCOME		
Membership		
Dues Earned	$147,735.89	
Subscription Earned	60,486.45	
Initiation Fees	39,148.75	
Miscellaneous Membership Income	1,481.49	$248,832.58
Publications		
Journal Sales	9,710.40	
Journal Advertising	376,335.00	
Handbook Sales	11,085.44	
Handbook Advertising	16,400.00	
Aeronautical Publications	28,237.47	
Special Publications	5,568.49	
Miscellaneous Publications	3,355.45	450,672.25
National Meetings		
Guest Registrations	2,141.50	
Dinner Tickets	7,764.70	
Display Income	8,610.00	18,516.20
Interest & Discount		
Interest Earned	7,900.86	
Discount Earned	141.10	8,041.96
Profit on Sale of Securities		1,441.41
Total Income		$727,504.40

EXPENSES		
Sections & Membership		
Sections & Student Branches	$ 13,863.56	
Sections & Student Branches Appropriations & Dues	38,452.97	
Membership	25,868.64	
Placement Service	4,972.52	
West Coast Office	12,718.49	
Miscellaneous Membership Expense	7,250.89	$102,927.07
Pro-Rated Administrative Expense (18.3%)		29,460.30
		132,387.37
Publications		
Journal Editorial	74,090.40	
Journal Advertising	109,088.75	
Handbook Editorial	16,423.60	
Handbook Advertising	2,984.37	
Aeronautical Publications	19,461.92	
Special Publications	3,502.33	
Miscellaneous Publications	9,615.99	235,165.56
Pro-Rated Administrative Expense (41.8%)		67,291.87
		302,457.43
National Meetings		
Department Expense	23,771.78	
Meetings	22,966.55	
Dinners	7,468.68	
Displays	3,869.06	
Awards	276.94	58,355.01
Pro-Rated Administrative Expense (10.3%)		16,581.55
		74,936.56
Engineering Advisory Services to Industry		
Land Vehicles & Aircraft	100,939.62	
CRC Appropriation	35,000.00	
Detroit Office	27,208.54	
Engineering Relations	3,120.15	166,268.31
Pro-Rated Administrative Expense (29.6%		47,651.59
		213,919.90
Total Direct Expenses	562,715.95	
Total Administrative Expenses	160,985.31	
Total Expenses		723,701.26
Net Income		3,803.14
Total Income		$727,504.40

Administrative and general expenses of $160,985.31 are prorated over to four functional Divisions in the proportion which these expenses bear to the total of the four Divisions.

to National Meetings was completed promptly – and, as the year drew to a close, a full program of national gatherings for 1946 was detailed. Discussions of postwar designs and production problems were prominent in meetings during the last quarter of 1945 and reports of an increasing number of engineers recently returned from Government missions abroad were featured.

The philosophy behind SAE Local War Emergency Meetings was to bring the sessions to the members in automotive production centers, instead of bringing the members to the meetings. The expedient proved eminently successful. Not only did the LWEMs achieve their primary purpose – that of providing forums for presentation of outstanding national meetings papers which otherwise would have been lost to the SAE – but they also brought a far greater total attendance than could have been expected for the originally scheduled National Meetings. In addition, they exerted a unifying influence by bringing closer together the SAE Sections and the SAE Activity groups. Continuance of this cooperation to the mutual benefit of both is indicated.

Major credit for the success of the LWEM program goes to the Sections which sponsored these wartime gatherings. In most cases, the LWEMs were superimposed on an already full schedule of Section meetings and thus meant a serious extra burden on Sections and their officers. The Society owes its gratitude and appreciation to the following sponsoring Sections: Buffalo, Cleveland, Dayton, Detroit (2 meetings), Kansas City, Metropolitan, Milwaukee, Northern California, Northwest, Pittsburgh, St. Louis, Southern California (3 meetings), and Western Michigan.

Membership Climbs Above 13,500—a New High Mark

The upswing in SAE membership continues. Currently, more than 13,500 members are on the rolls – an all-time high – and the total is growing each month.

Immediately after V-J Day, applications for membership dropped somewhat as compared with the same months of 1944. *Total applications* for membership in 1945, however, were only a few per cent below 1944's total of 2407, giving every indication that total *membership* will continue upward, since less than 450 members were lost during 1945 because of death, resignations, and cancellations.

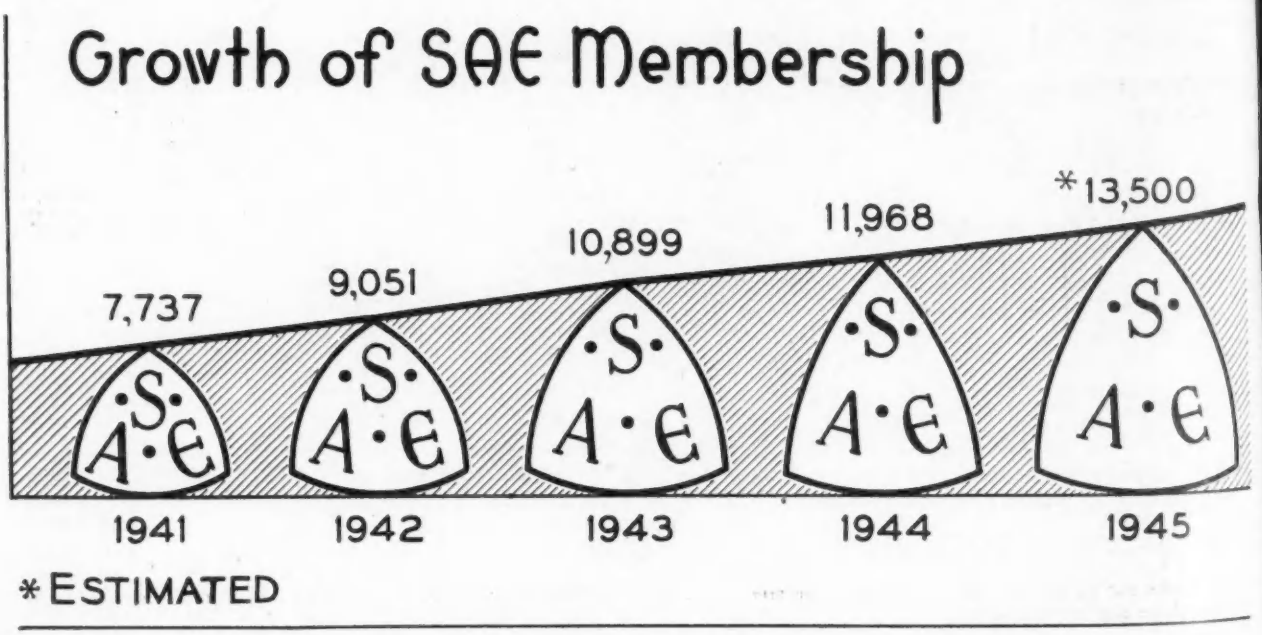
Confidence in potential membership increase on the Pacific Coast – which led Council to establish a West Coast Branch Office in 1941 – has been amply justified as 1945 data again prove. Since establishment of that office, membership has grown approximately 190% in the territories of the Southern California, Northern California, Northwest, and Oregon Sections and of the Spokane and Salt Lake City Groups – which are served by the West Coast Branch Office.

SAE Student Enrollment was limited throughout 1945 by the fact that a high percentage of engineering students was in military service. SAE Student Enrollment near the end of the year stood at 73% of its best previous year, a good showing considering that registration at engineering colleges ranged from 10% to 25% of normal.

■ Placement Service Aids Vets

During 1945, as during the other war years, SAE Placement Services worked in close cooperation with members available in war plants and with war plants seeking engineers for essential posts. The number of SAE members available was comparatively small in comparison to the needs of war plants, but a number of placements were effected through contacts arranged by the Placement Service. The picture changed rapidly after V-J Day. Within two months, the number of SAE members available increased approximately 40% while the number of positions available was cut in half.

Currently, a special effort is being made to help men discharged from the Armed Forces. Qualifications of returning SAE member veterans are being listed regularly in the *SAE Journal* and a separate "Veterans Available"



bulletin is being sent to prospective employers – in addition to the regular "Men Available" bulletins.

A new folder describing the functions and use of the SAE Placement Service was issued during the fall and is available upon request.

Technical Committees End War Job, Reconvert Quickly

Formation of the SAE Technical Board to exercise general supervision and direction of all SAE Technical Committee activity undoubtedly was the most important administrative move made by the SAE in many years. Brought into being shortly after V-J Day, the new Board, acting under its broad grant of power from the Council, had detailed its rules of procedure by the end of the year and had begun gradual reorientation of the SAE's technical committee work into a structure even better adapted than in the past for service to industry and Government.

War engineering projects comprised the bulk of SAE technical committee work during 1945, although numerous reconversion and peacetime projects came into focus toward the end of the year.

■ W.E.B. War Projects Total 130

Twelve meetings of the War Engineering Board were held during 1945, together with 86 meetings of committees of the Board. Among the 23 new projects completed were two emergency projects for the War Production Board, one on the use of carbon black in mechanical rubber parts, the other on minimum requirements of tin in automotive equipment. W.E.B.'s total of completed war projects was 130.

The Iron and Steel Committee has continued to be one of W.E.B.'s most active groups. Its reports covering process control of gray iron, malleable iron and steel castings have been particularly valuable. A final report on special additive agent steels, resulting from a two-year study, should be ready for distribution early in 1946. Work with representatives of the American Iron and Steel Institute on hardenability has continued.

The W.E.B. work on vehicle controls for disabled veterans probably has attracted more public attention than any other. Several manufacturers equipped cars experimentally with the types of devices recommended by this committee. Demonstrations of these cars, under supervision of the American Association of Motor Vehicle Administrators, have been made in Chicago and Trenton, and under supervision of the Surgeon General of the U. S. Army, at Washington, D. C.

Other W.E.B. projects of particular interest last year included issuance of a comprehensive spring manual by the Board's Spring Committee and inauguration of a study of torsion bar springs and of Belleville and ring springs which later will result in issuance of additional manuals.

A report undertaken for Ordnance late in the year, and scheduled for 1946 completion by W.E.B., will cover process and control procedures for brass and bronze castings.

■ Standards Work Stresses Materials

Of vast importance in the 1945 SAE standardization activities has been the work in the field of materials. Newer steel types have been studied with a view to ultimate revision of SAE standard compositions – and studies have been intensified regarding application of hardenability in classification and selection of steels. Among the nonferrous metals, specifications for aluminum-, magnesium-, and copper-base alloys particularly have been reviewed and modernized. Agreement has been reached on tables of designating numbers and screening tolerances of shot for peening and cleaning, and for cleaning grits. This program is being extended to include shot peening quality tests and instrumentation as a standard basis for shot quality.

Rubber and synthetic materials classifications have been clarified and considerable work done on specifications for parts from them.

To meet the urgent need of vehicle manufacturers for recommending types of oils in instruction books, the Lubricants Division is working on (as General Information) definitions for the required three types of lubricants; namely, regular, premium and heavy-duty oils.

During the year, a new Passenger-Car Body Division inaugurated a standards program covering body construction materials, to which other body items will be added as needs require.

Most important dimensional standards development of the year relates to involute splines for general applications. Completed studies of the interference effect of vehicle electrical equipment on television and FM high-frequency broadcasting is another 1945 accomplishment of special interest.

Progress was made toward international standardization of screw threads in which SAE has participated as one of two American sponsors under the American Standards Association for American standard screw thread projects.

■ Increases in Aeronautical Work

The work of the SAE Aeronautical Division committees during the past year has been almost equally divided between the development of industry (SAE) standards and the review of Government standards to bring them into line with the latest requirements of the industry. Fifty-seven reports covering 71 separate AN standards have been developed by the committees of the Aircraft Engine Subdivision and transmitted to the Engine Technical Committee of the Aircraft Industries Association of America, for forwarding to the Government. In addition, 31 other recommendations on Government standards pertaining to propellers and other accessories have been forwarded to the Government.

Ten new Aeronautical Standards and seven revised Aeronautical Standards and Recommended Practices have been approved and issued during the past year. Fifty-six new AMS and 97 revised AMS have been developed by the Materials and Processes Committees after thorough coordination and consultation with the interested raw material suppliers. The wide usage of these specifications is indicated by the fact that over 3,000,000 copies have been distributed to the industry and over 5000 separate companies and individuals are on the SAE mailing list to receive either copies of new and revised specifications or announcements concerning their availability.

An Aeronautical Recommended Practice listing standard nomenclature of aircraft engine parts has been issued. In addition, a new committee, whose purpose is the de-

velopment of standard aircraft engine maintainance tools, has been developed under the direction of the Aircraft Engine Subdivision.

The Propeller Subdivision and the Engine Subdivision have cooperated actively in the development of standards for propeller shaft ends.

An extensive program pertaining to preservation and packaging problems of aircraft accessories and spare parts was completed during the past year.

A Special Aircraft Projects Subdivision was organized during the past year to coordinate the cooperative technical work of SAE committees which are of interest to more than one of the existing Subdivisions of the Aeronautics Division.

Under this Subdivision, there is being prepared a new SAE Aeronautical Drafting Manual.

Also, under this Subdivision a considerable amount of work has been done in preparing and disseminating data pertinent to helicopter development.

Cold starting of aircraft engines has always been a problem to aircraft operators. Under this Subdivision there has been established a committee which serves as an advisory group to the Government on problems of cold starting and also aids the Services in their program of testing for cold starting requirements at the Cold Weather Experimental Testing Base in Alaska.

■ Tractor Technical Group Activity

The Tractor War Emergency Committee held 10 meetings during 1945.

Its Mud Testing Committee visited Aberdeen Proving Ground twice during the year at the request of the Ordnance Department.

The principal subjects that have occupied the time of the TWEC have been tractor tire equipment, tractor fuel test program, mud testing committee and the Nebraska Test Code.

The Rubber Manufacturers Association and the Tire & Rim Association have come to rely on the TWEC for advice with respect to tractor tire and rim sizes.

Following suggestions of the TWEC subcommittee on Tractor Fuels more than a year ago, two oil companies made test quantities of the types of tractor fuels suggested. All tractor companies ordered these fuels and conducted tests in accordance with the test procedure prescribed by the TWEC. Results of these tests were submitted to the Coordinating Research Council.

The Mud Testing Committee of the TWEC has issued three progress reports giving its opinion of proposed mud testing facility – also recommending the test procedure for laboratory and bin test work at Auburn Farm Tillage Machinery Laboratories, Auburn, Ala., and recommendations covering field testing of various tract designs. The procedure recommended by the committee is being followed in detail at Auburn.

■ T&M Technicians Win Citation

All Transportation and Maintenance technical work was operated in 1945 under the general direction of a single Transportation and Maintenance Technical Committee.

With this integrated committee structure, the SAE Transportation and Maintenance men were able to make their contribution to Government agencies, to Ordnance and to industry more efficiently. The T&M working committees cooperating with the Office of Defense Transportation continued their work until all projects were completed late in the year. Recognition of the results produced by these committees came in the form of a citation from President Truman and an official letter of appreciation from ODT Director Johnson.

The T&M groups working under the SAE Ordnance Vehicle Maintenance Committee finished their final assignment in October. One report issued under this committee was published as an Army manual and ordered distributed to every Army company having motor trucks.

T&M technical committee services to industry were placed on a continuing basis during 1945 and projects developed for completion in 1946. One 1945 report, "Engine Deposits – Prevention and Removal" – has had distribution through the SAE Special Publications Department to the extent of 20,000 copies.

■ CRC Active

While military fuels and lubricants problems were again a predominant element in the work of the Coordinating Research Council, Inc., as the end of the year approached, postwar problems of pressing significance began to come to the fore.

In the lubricants field, 19 test procedures have been issued which were either entirely new or which have undergone major revisions. Gear oil problems were the subject of extensive laboratory and field study. Among the aspects of the gear oil problem investigated were oxidation, foaming, pour, rusting, extreme pressure characteristics, chemical identification, compatibility, and low temperature effects. New grease test procedures were developed covering low temperature torque, bomb oxidation, pumpability, water resistance, high temperature greases for aircraft, corrosion, separation, and other items. Important work also was done on the long-time protection of stored Ordnance equipment and on hydraulic brake fluids.

An engine-fuel relationship group was organized to accelerate the coordination between postwar fuels and postwar engines for military operations from an industry viewpoint. Gasoline additives were the subject of intensive study. Work on vapor lock and a broad program to improve laboratory knock-testing were among the important elements in CRC operations in the aircraft fuels field. The fuel requirements of spark ignition engines used in farm tractor engines were also the subject of extensive research in cooperation with the Tractor War Emergency Committee of the SAE.

SAE Publication Service In Process of Expansion

Outstanding development in the publication area during 1945 was the establishment at SAE Headquarters of a Special Publications Department charged by the Publication Committee with responsibility for disseminating as widely as possible on a self-supporting basis the meetings papers, technical committee reports and other technical data growing out of the various activities of the Society. As a result, distribution of mimeographed papers already has been expanded further than ever before and 11 tech-

concluded on page 49

PRESIDENT for 1946 _ _

L. Ray Buckendale

L. RAY BUCKENDALE started to work for the Timken-Detroit Axle Co. on a part time basis while still a student at the University of Michigan. He has been there ever since – making ever-increasing contributions to engineering design, playing vital roles in development of military ground vehicles in two World Wars, and serving the automotive engineering profession by application to cooperative technical projects of his high abilities as an analyst and administrator.

He operates aggressively both as an engineer and as an executive – but, his associates say, he refuses to move until he gets all the available facts. That the facts are often hard to obtain doesn't move him to acting without them. "Ray always keeps in mind the simple laws of mechanics," is the way one longtime associate describes his methods of operation. "All forces must be a closed circuit. If some force is out on the loose – something is wrong. Sticking to that theory, Ray frequently prevents favorable decisions on 'fatal' constructions. He is a stimulating antidote to all those who want to wave wands and hope for the best."

Ray Buckendale is the first native Detroiter to be president of the SAE. He was born in the automotive capital on April 19, 1892, and went to Detroit public schools, Amos School, and Western High School before entering the University of Michigan, from which he was graduated with a Bachelor of Engineering degree.

While still in school, he worked as a draftsman for the University Motor Car Co. and the Demot Car Co. and as a machinist for J. N. Smith – then as a draftsman for Timken-Detroit. He was making an exceptional record in engineering design before the arrival of World War I and a temporary leave of absence from Timken.

As a captain in the engineering division of the Army's Ordnance Department and technical officer on tanks, he was sent to London to follow through on the detailed design development of the Mark VIII tank – then came back to the United States to supervise production of the pilot model of that famous weapon at the Locomobile Co. in Bridgeport.

Working closely with Ordnance engineers ever since, both as an individual and as a member of the SAE Ordnance Advisory Committee and the SAE War Engineering Board, he contributed greatly to development of many of the heavy-duty trucks and tank-transport vehicles which helped bring victory in World War II.

He joined SAE in 1919, and as early as 1923 had begun the active participation in SAE technical committee work which was climaxed a few months ago by his appointment as chairman of the distinguished SAE Technical Board which now supervises and directs all SAE technical committee activity.

High among his personal interests are books and boats. His home is located in Windmill Point, in a community where a boat house is just as much standard equipment for each home owner as a garage.

The 1946 president of the SAE is a man of many abilities and widespread interest.

SAE COUNCILORS

PAST-PRESIDENT J. M. CRAWFORD (left), General Motors Corp., becomes a councilor; PAST-PRESIDENT W. S. JAMES (center), Ford Motor Co., continues as councilor; B. B. BACHMAN (right), Autocar Co., continues as treasurer.

Continuing on the SAE Council are R. J. S. PIGOTT (left), Gulf Research & Development Co.; J. C. ARMER (center), Dominion Forge & Stamping Co., and Canadian Motor Lamp Co., and FRED C. PATTON (right), Los Angeles Motor Coach Lines.

A. J. Blackwood

Councilor A. J. Blackwood (M '27) is assistant director, Research Division, Esso Laboratories, Standard Oil Development Co. As such, he is responsible for engine testing and laboratory development work on automotive, diesel and aviation fuels.

After graduating from Cornell in 1924, Mr. Blackwood spent three years on the engineering faculty as an instructor in the experimental test laboratories.

He has been author or co-author of many technical papers. He has been a member of the Diesel Engine Activity and Tractor and Farm Machinery Activity Committees, and was SAE Vice-President representing Diesel Engine Activity in 1944.

C. E. Frudden

Councilor C. E. Frudden (M '17) is consulting engineer for the Tractor Division of Allis-Chalmers Manufacturing Co. He studied mechanical engineering at Iowa State College and Columbia University. Since 1910, when he first became identified with the tractor industry, he has held executive engineering posts with several companies. He joined Allis-Chalmers in 1929 as engineer in the tractor division, advancing the next year to chief engineer of the division.

Mr. Frudden has taken an active part in the standards work of the Society since 1923, and in 1938 was SAE Vice-President representing the Tractor and Farm Machinery Activity.

A. E. Raymond

Councilor A. E. Raymond (M '37) is vice-president in charge of engineering, Douglas Aircraft Co., Inc. He graduated from Harvard in 1920 and received his M.S. in aeronautical engineering from M.I.T. the following year. In 1925 he joined Douglas. His rise was rapid, and in 1926 he became assistant chief engineer. At the same time he held the chair of associate professor of aeronautics at the California Institute of Technology. In 1934 he attained his present position.

Mr. Raymond has been active in SAE standardization work as vice-chairman of the SAE Aeronautical Division during the war period. He has also been a member of the Aircraft Activity Committee.

VICE-PRESIDENTS

THOMAS L. HIBBARD

Vice-President, Passenger Car Body Activity

Thomas L. Hibbard (M '32), assistant director of the Ford Motor Co.'s Design Department, started as a designer in the custom body business in 1916 with Rubay. In 1923, after a year in the AEF and association with several automobile body companies, he went to Paris and formed the firm of Hibbard and Darrin.

In 1932 he returned to the United States and joined the General Motors Styling Section. He opened his own styling and design business in New York in 1934, and was consulting designer for Studebaker, Bantam and other companies until 1940 when he joined the Ford Motor Co.

★ ★ ★

Neil A. Moore

Vice-President, Production Activity

Neil A. Moore (M '33) is vice-president and general manager of the Sealed Power Corp. He received his B.S. in chemical engineering and his M.S.E. at the University of Michigan. In 1922 he joined Continental Motors Corp. as assistant metallurgist.

In 1924 he joined his present company, then named the Piston Ring Co. In 1927 he became metallurgist, in 1933 assistant general manager, and four years afterwards, general manager. Later he was elected vice-president and made a director of the company.

He has been a director of the National Association of Manufacturers and of the Automotive and Aviation Parts Manufacturers, Inc., and is a member of the Engineering Society of Detroit and the American Management Association.

★ ★ ★

G. A. PAGE, JR.

Vice-President, Aircraft Activity

G. A. Page, Jr. (M '29), director of engineering, Curtiss-Wright Corp., threw in his lot with the aircraft industry in its infancy, and has been intimately and actively concerned in it since. He approached aircraft engineering via shop and drafting room, night school and correspondence school.

He joined the Curtiss Engineering Corp. in 1917, and subsequently became project engineer, chief of the design section, and chief engineer for Condor transport development in St. Louis, a Curtiss-Wright Corp. project.

VICE-

ERVIN N. HATCH

Vice-President, Transportation & Maintenance Activity

Ervin N. Hatch (M '32) is senior automotive mechanical engineer of the New York City Transit System, Board of Transportation. He has had extensive engineering experience in analysis, materials, inspection, maintenance, sales and service, and has applied his knowledge to problems of public utilities and manufacturing industries.

During the war he served on SAE Army advisory committees working on numerous automotive problems. In his present position he is in charge of all maintenance engineering problems, supervises maintenance facilities, and prepares specifications for new equipment.

H. S. Manwaring

Vice-President, Diesel Engine Activity

H. S. Manwaring (M '25) has been active in automotive engine development work since 1919. After his graduation as a mechanical engineer from the University of Michigan in 1916, he entered the U. S. Army and went to France, where he helped organize, and taught in, a motorized artillery school.

After World War I, he joined U. S. Radiator Corp., and subsequently went to Zenith-Detroit Corp. where he was sales manager, then to Continental Motors Corp.

He is now with the Truck Division of International Harvester Co., as chief engineer of the Research and Development Division of the Gas Power Engineering Department.

He was vice-chairman of the Chicago Section in 1944, representing Tractor and Diesel Engine Activity.

J. E. HALE

Vice-President, Passenger Car Activity

J. E. Hale (M '13) has been almost constantly connected with the tire industry since his graduation from M.I.T. in 1908. As a tire development engineer, he has engaged in projects which have resulted in many important innovations, among them improved solid tires for motor trucks, balloon tires, successful application of low pressure tires to agricultural tractors, and super giant pneumatic tires for dirt hauling units. He is now chief engineer of the Tire Division of Firestone Tire & Rubber Co.

Mr. Hale was an active member of the SAE Ordnance Advisory Committee for many years, and worked closely with the Ordnance Department.

CHARLES FROESCH

Vice-President, Air Transport Activity

Charles Froesch (M '16) has been chief engineer for Eastern Air Lines, Inc., since 1935. Born in Paris, he received his elementary education there and his technical training in this country. He has applied his aeronautical knowledge and experience in France and the United States, and through two World Wars. He has been draftsman, airplane and engine inspector, aeronautical engineer and, before assuming his present position, was general service manager, sales engineer, and patent engineer for Fokker Aircraft Corp.

He is a past vice-chairman of SAE Metropolitan and Baltimore Sections.

PRESIDENTS

J. C. GENIESSE

Vice-President, Fuels & Lubricants Activity

J. C. Geniesse (M '27) obtained his Ph.D. in chemical engineering at the University of Michigan, where he afterwards taught for four years. In 1925 he joined the Atlantic Refining Co., where he is at present process supervisor on lubricating oils, wax and grease in the Research and Development Department.

Mr. Geniesse has been active in fuels and lubricants technical work, having served on the Lubricants Division of the SAE Standardization Committee since 1933 and as a member of numerous technical research groups. He was chairman of the Philadelphia Section in 1935-1936.

Earle A. Ryder

Vice-President, Aircraft Powerplant Activity

Earle A. Ryder (M '11), consulting engineer for Pratt & Whitney Aircraft, has worked on aircraft engine designing and testing since 1914. He received his mechanical engineer's degree from Cornell the year he joined the Society, after which he worked as a draftsman for several automobile companies.

His early experience was gained with Simplex Auto Co. and Aeromarine Plane Co. He became associated with Pratt & Whitney in 1925, the year of its founding.

Mr. Ryder has been active in many SAE technical committees and is a member of the Coordinating Fuel Research Committee of the Coordinating Research Council.

BEVERLY W. KEESE

Vice-President, Truck & Bus Activity

Beverly W. Keese (M '28) began his engineering career as draftsman for Kissel Motor Car Co. After a year as tool designer for Keller Tool Co., and a year as chief engineer for Turman Monahahn Mfg. Co., he worked with Army Ordnance during 1918. He then became chief tool designer for Wisconsin Parts Co., which later became the Wisconsin Axle Division of Timken-Detroit Axle Co. In 1938 he was appointed vice-president in charge of engineering.

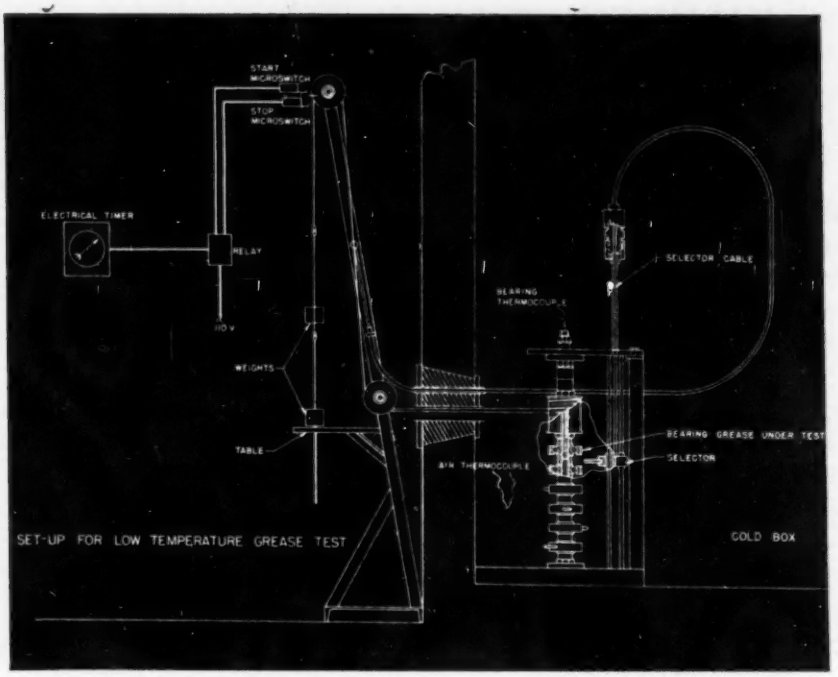
He spent considerable time after 1930 with Army Ordnance, working on the development of all-wheel vehicles and tank transmissions.

E. A. PETERSEN

Vice-President, Tractor & Farm Machinery Activity

E. A. Petersen (M '42), assistant chief engineer, Tractor Division, Massey-Harris Co., has had extensive experience in automotive development work. He worked on chassis and body drafting for Mitchell Motors Co., and then held supervisory engineering positions with Insull-controlled industrial companies. After this he spent 10 years with Nash Motors Co. doing passenger car development work.

He has been active in the Tractor and Farm Machinery Activity since the year he joined the Society, and was a member of the Tractor War Emergency Committee in its early days.



Schematic diagram of Douglas low temperature grease test

LUBRICANTS TASK NOT COMPLETE

Digest of a paper

by D. H. MORETON
Douglas Aircraft Co., Inc.

■ So. California, Aug. 24

(Paper entitled "Problems Involved in Airframe Lubrication")

OUTSTANDING wartime accomplishments in meeting the demand for operational flexibility have not exempted aircraft engineers from further and continuous experimentation, in Mr. Moreton's opinion. He feels that solutions evolved hastily and from strict necessity may not have been the best solutions to the many lubrication problems which arose in wartime, and that there is still much to be done.

Atmospheric temperature variations and their importance to the lubrication problem have been considerably overemphasized, he believes. Although ships not appropriately designed cannot be expected to function satisfactorily in alternately freezing and extremely hot temperatures, he said, still surveys have shown that occasions when ground temperatures reach —50 F or lower constitute about 1½% of the number of days involved in the more serious winter months, and then for brief periods of the day only. Thus, he said, extreme low temperature lubrication need not disproportionately occupy the airframe lubrication engineer. At the present time, he explained, successful operation of lubricants at these extreme low temperatures would involve a sacrifice in unit design or lubricant stability at normal temperatures.

Variations in humidity, he said, though less frequently recognized as trouble makers, may be more serious. Partially filled bearings and non-hermetically sealed units containing grease or oil he described as particularly good spots for the accumulation of moisture in humid climates; or moisture may occur from condensation under rapid changes in temperature and pressure.

Even pressure variations at high altitudes present lubrication problems, he said.

Although there are any number of operational conditions which may lead to complications, Mr. Moreton maintains that they are, fortunately, easier to solve than to predict. Some are known and must be allowed for in design:

1. High temperatures within the engine and near the brakes cause loss of lubricant and freezing of bearings.

2. High velocity airflow causes aspiration of lubricants from units and aspiration of separated oil from greases in shielded bearings.

3. Vibration rates up to 2000 cycles per min with amplitudes of 1/32 in. tend to hammer lubricants from bearing surfaces.

4. Infiltration of corrosive exhaust products in bearings aft of engine exhausts causes extreme bearing corrosion.

5. Subjection of the ship to cleaning solvents and steam cleaning results in lubricant deterioration or removal.

6. Exposure to salt air and sea water induces corrosion, lubricant deterioration and loss of lubricant.

The inadequacy of present low temperature lubricants is shown, he pointed out, by tremendous replacements of shielded bearings in the 200 F sustained temperature area. In wheel bearings, the same grease must react well enough in low temperatures so as not to interfere with starting, and still remain in the bearing at the high temperatures sometimes reached during maximum braking effect. There are still aircraft in the air, he said, which do not have the disc-type high energy brakes which can keep wheel temperatures down to the 150 F level.

To complicate lubrication problems, he said, there are in the same airframe bearings differing widely in size, design and lubrication requirements.

In addition, there are any number of other mechanisms requiring lubrication, and considerations of weight and reliability requisite in the design of bearings and other mechanisms serve to render the lubrication problem more complex.

A partial answer to the question of what lubricant to use, Mr. Moreton said, can be derived from various sources of information such as AN aeronautical specifications, petroleum company recommendations, and the results of airframe manufacturers' laboratory tests and field work. Drawback here, however, is that AN coverage, to be broad enough to insure universal availability and satisfaction of both Army and Navy requirements, has been forced into broad specifications which sacrifice certain qualities in lubricants which might be necessary to a certain mechanism design. He feels encouraged by the increased use of laboratory performance tests, however, and believes that, carefully checked against actual performance, they will be a distinct boon to the airframe lubrication engineer.

In addition to the assistance of technical staffs of petroleum companies, Mr. Moreton said, a great deal of progress has been made through the cooperative efforts of airframe manufacturers, and the pooling of their knowledge and experience.

Aircraft companies at present, he reported, are carrying on intensive tests on temperature effects of lubrication, stability, bleeding, evaporation, and load carrying ability of various lubricants. Tests are comprehensive and on the whole excellent, and Mr. Moreton feels that they will fill the bill satisfactorily until such time as complete specifications by either government or industry are available. He described the method used by Douglas to predict the comparative low temperature performance of aircraft greases. The test rig, shown in the accompanying diagram, contains six standard #204 Conrad bearings, packed full of test greases. Bearings are rotated at a uniform rate, and the test is run at successively lower temperatures until channeling or freezing occurs. Torque-rate ratio for the grease at each temperature is calculated from such data as break-away force, force applied for each run, time to complete measured distance, and bearing temperature.

Considerations other than that of quality, he explained, are factors such as versatility – that is, applicability to wide usage – to cut down the number of different lubricants required per ship; global availability, to make possible any necessary servicing at way points; and cost and uniformity of the lubricants.

In spite of rapid wartime advances, Mr. Moreton pointed out, aircraft lubrication is now at about the same developmental stage as the automobile grease cup stage. However, he said, opportunities and facilities are not lacking for simplification and unification of airframe design requirements and of the many lubricants available. Expecting the momentary advent of 5 min fuel servicing and 15 min powerplant change, he offered a challenge to airframe lubrication engineers to see that lubrication does not lag behind.

SIMPLICITY

The Keynote in Fueling For Safety, Speed, Ease

Digest of a paper

by A. O. PAYNE
Ohio Pattern Works & Foundry Co.

■ So. California, Oct. 4

(Paper entitled "Fueling: A Half-Forgotten Bit of Aircraft Design")

CONCERTED effort by airport designers and builders can bring radical improvement in aircraft fueling techniques, Mr. Payne said, urging that a rational approach to the problem requires scuttling of the old principle that the operation should be made as difficult as possible. There is very little right with present fueling methods and apparatus, as Mr. Payne sees them.

Necks of openings, he said, are generally encumbered with screens whose main function is to induce overflowing and collect dirt; fuselage tanks are often fitted with inner and outer fill caps which make excellent pockets for explosive fumes; small fill openings in smaller aircraft slow up fueling, and internal design necessitates long flexible metal tubes with high mortality rate.

Nozzles are a troublesome bottleneck, responsible for much power loss, and usually equipped with strainers designed to collect dirt at the most inaccessible point.

Fueling pits, he pointed out, are awkward and inconvenient, have the disadvantages of congestion and water and snow accumulation, and lead to rapid wear of hoses and nozzles; tank trucks, on the other hand, are always in the way, have hopelessly inadequate delivery rates, and are even more abusive to nozzles and hose lines.

As a partial solution to a problem the details of which ultimately must be worked out by individual designers with an overall rational plan in mind, Mr. Payne offers the following suggestions and objectives:

Filler neck in the landing gear well rather than over or under the wing. This would bring the operation closer to the ground and prevent damage to delicate wing structure and propellers and danger to personnel.

Nozzle design should emphasize light weight, improved internal structure for faster delivery, provision for vapor return, self-operating shutoff against overflow, efficient hold-open device, and tight, quick connection. Dropping should not harm nozzles.

Ground equipment must insure safety for both operator and aircraft. It should be capable of delivering 200 gpm, to a height of 15 ft, over or under the wing in all weather.

Mr. Payne recommends several pumps which will automatically go into operation one by one in response to pressure drops as more fuelers are started. This would keep pressure constant and maintain operations even in the face of a breakdown of one pump.

Mr. Payne prefers landing gear well fueling because of the many definite disadvantages of other methods.

Overwing fueling is difficult and subject to all the hazards of fire, weather and human limitations.

Underwing loading under present conditions cannot provide for adequate automatic shutoff, quick coupling, defueling or gaging.

Fueling through fuselage involves a serious additional fire hazard, requires long fill lines, adds dead weight, and makes defueling and gaging impossibly complicated.

Advantages of putting filler neck in the landing gear well are the similarity of the operation to present practice regarding nozzle and connection requirements, possibility of using an ordinary filler cap, direct gaging through transparent sight glass, and comparative ease of defueling.

ECONOMY

Number One Postwar Need For Passenger Transport

Digest of a paper

by EARL B. RICHARDSON
Portland Traction Co.

■ Northwest, Sept. 15

(Paper entitled "Postwar Maintenance")

AFTER four years of struggle against critical shortages of men and materials, the passenger transportation industry now will be confronted with a problem even more serious, according to Mr. Richardson. War-swelled revenues cannot continue in the face of the expected boom in passenger car sales, he said, and only strict economy will save the industry from peacetime disaster. Since labor and materials costs will probably remain constant or rise, Mr. Richardson sees maintenance costs as the only remaining costs logically open to attack in the fight to maintain profits.

He described a number of ways in which this can be done.

Time studies, for example, can effect economies all out of proportion to the cost of hiring an expert for the purpose, Mr. Richardson believes. Time study evaluates each operation as a whole and by steps, and efficient schedules of inspection operations can be worked out. By careful thought, operations may be lined up so that the vehicle moves along a kind of inspection assembly line. Much greater specialization of labor is possible, he explained, and much time is saved over the old method of all inspectors working on the same machine at the same time. Under this arrangement, inspectors' hours are staggered so that no time is lost waiting for machines to arrive from previous operations.

By a similar process, repair operations are broken down step by step, and specific instructions submitted to repairmen.

Training programs for inspectors and repairmen are similar time and money savers. Mr. Richardson described Portland Traction Co.'s system of converting old vehicles into schoolrooms, furnished with all necessary information concerning construction and methods of inspection and repair. Trainees work part time on the training vehicle, part time on actual machines. He believes such a program, supplemented by periodic refresher courses, makes an invaluable contribution to efficiency.

Research can be applied to determining how often a given part must be inspected; some may safely skip a few inspections, and others may be left until overhaul without danger. Reclaiming of parts and materials was the rule rather than the exception during the war, and a great deal of helpful information has been gleaned from this experience. Research can determine the point at which salvage passes the limit and becomes scrap. On-the-premises crankshaft regrinders and other equipment save time and money.

Mr. Richardson feels that the intangible factor of employee good will, maintained by grievance machinery and good working conditions, cannot be over-emphasized.

He also believes that the time has come for the formation of a group of field engineers with a rolling laboratory to check designs, analyze conditions, and suggest improvements which will facilitate maintenance. This will aid in enlisting the cooperation of manufacturers in the interests of simplicity and accessibility of parts.

FACILITY

Better Casting Design Gained by Cooperation

Digest of a paper

by RICHARD S. FRANK
Caterpillar Tractor Co

■ Peoria, June 11

(Paper entitled "Casting Design")

AN understanding of the technical problems which confront the foundryman in carrying out casting designs would do much to improve the work of the design engineer and also the end product of their combined efforts, Mr. Frank believes. There is far too little cooperation between the two, he said, and apparently no realization of the benefits attainable by interchange of knowledge and opinions. He feels that if casting is to retain its present important position as a fabricating method, this situation must be remedied.

Before consulting the foundryman, Mr. Frank pointed out, the designer can do a great deal himself to make his design simpler, stronger and easier to fabricate. General principles he should keep in mind as he works are:

1. Uniform metal sections should be used; adjacent light and heavy sections should be avoided or carefully blended.

2. Sharp corners provide stress concentrators and should be avoided; fillets should be used at junctions and wall intersections, particularly at inside corners.

3. Ribs can reduce required thickness by strengthening walls; they will help prevent warpage of a plane surface, increase stiffness, and further the mechanical utility of the casting.

4. Narrow deep pockets should never appear in casting design. They are diffi-

cult to cast, and may produce a scrap casting when they necessitate protruding islands of sand.

5. Inserts, in spite of their contribution in the making of intricate shapes or long straight holes, present a serious problem of fusion between insert and cast metal.

6. "As cast" tolerances cannot reasonably be held much closer than 1/32. Finish and machining of the face may do the job after casting.

7. Reduction of size and/or weight is always an advantage when consistent with adequate performance, especially since cost is almost directly proportionate to weight.

8. Long slender cores are difficult to remove, and if requisite to the design should be straight and well anchored.

9. Outward appearance is important – clean, simple and flowing lines, and absence of unnecessary projections.

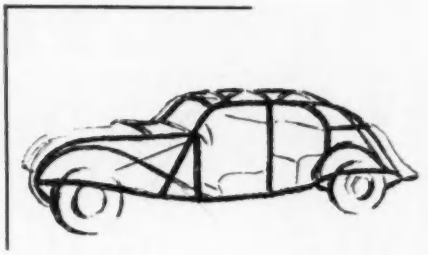
In addition to such general design principles, when matters involving such questions as pattern layout, mold venting and metal pouring arise, Mr. Frank said, it is time for conference with the foundryman. The latter can do much to help a designer who may know bare fundamentals of the casting process, but no more.

The foundryman usually can determine quickly and easily from the designer's picture whether the operation will be as simple as possible, requiring an ordinary molding technique. Irregular parting lines increase molding costs; most convenient parting lines can be established by the foundryman. The design must provide for sufficient draft and the prevention of blow and gas holes. The number of dry sand cores should be held to a minimum; sometimes a slight change in the position of a wall or rib, by cutting out a sand core, will save cost. Proper positioning of clean-out holes will facilitate the removal of the sand cores. The foundryman probably has a better conception of how sectioning should be planned for regular solidification, and of how pouring can be made simple. Hot spots from undue concentration of metal where walls or ribs intersect must be guarded against; the foundryman can tell whether a core is necessary through the center of an intersection to reduce a hot spot.

In addition to these considerations which affect actual ease and efficiency of production, the foundryman may be able to suggest variations from the original design which will effect savings. In this particular, Mr. Frank believes he should be given considerable initiative. For instance, two or more simple castings welded or bolted together may take the place of one expensive complex casting. Careful consideration of scrap loss and complexity of machining and assembly may reduce cost.

Four major objectives of any casting design, according to Mr. Frank, should be functional utility, mechanical quality, production cost and appearance. The foundryman may be able to make suggestions which will improve any or all of these characteristics.

Casting is inexpensive when applied to large or complex sections, and can be used to advantage in giving strength and rigidity to intricately shaped, multi-partitioned metal sections. This advantage can be fully realized, Mr. Frank believes, if foundrymen and designers lose their fears of being caught in ignorance of some basic design or operational principle which could be easily and economically exploited by concerted action.



SHOULD TH Be Integral With Body?

Excerpts from a paper

by THEODORE ULRICH
Nash-Kelvinator Corp.

■ Detroit, Sept. 24

(*Paper entitled "The Frameless Car"*)

THE engineering of an automobile, to be successful in a competitive market, must be sound in one important respect – efficiency per pound of material used in fabrication. The one big offender in conventionally designed automobiles has been the chassis frame. Over the years 1926-1940, efficiency per pound of material used has gone up considerably, except in the case of the chassis frame; we find that from year to year it has increased in weight and cost. These increases in weight have been necessitated by the constant demand for stiffer frames in order to give better stability and road holding qualities, and to help prevent body failures.

Automobiles which eliminate the chassis frame entirely have been successfully produced in Europe for a number of years; however, they are typical small cars, produced in sufficient volume to justify adequate tooling. A few skeptics in 1937 did not believe it could be done on the larger cars the public demanded in our country, and at the same time show an advantage in efficiency per pound of material. However, the results obtained were surprising. The "Unitized" principle of construction in the Nash 600 model uses the existing body shell, combined with a system of stiff box sections along the sill directly underneath the door pillars extending from front to rear bumpers, together with the formed and ribbed cowl side panel extending from the front door opening to the front bumper mountings, the formed rear quarter panel extending from the rear door opening to the extreme rear end of the body, and the roof and cowl top drawn in one piece and welded to boxed-in roof rails.

This unitized structure takes advantage of all body stampings except the doors, particularly the outer skin which is stressed and put to work combined with box sectional framing. Skin-stressed outer panels, combined with the inner framing, give a structure exceedingly stiff in all directions, showing a saving of weight which cannot be duplicated by a separate body and chassis frame design. The conventional chassis frame, due to its shallow nature, is torsionally weak, and it is difficult to stiffen it materially without adding excessive weight. Considering the following six points, it is hard to justify a separate chassis frame:

1. Front end stiffness: deep side sections with diagonal bracing, of light gage steel at the points where they project beyond the cowl, eliminate the abrupt structural change inherent in conventional design; the modulus at this point is at least six times greater than that of a chassis frame.

2. Additional all-around stiffness is greater by 53% than in certain big production cars produced up to this time.

3. Additional material used in a unitized body amounts to only 48 lb. Compare this with a frame weighing 200 lb, plus body mounting parts.

4. Saving of weight in the body unit plus economies effected in the motor, transmission and wheel suspensions, gives an advantage in weight of 275 lb over the conventional car, 160 lb of which comes from the elimination of the frame.

5. There is a steel weight saving of about 9%.

6. Unitized construction gives greater durability because of improved strength and stiffness. A considerable advance in road suspension technique is made possible by the increased rigidity and decreased frictional loss realized by this type of construction.

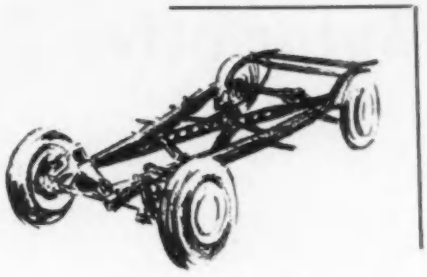
In final assembly, the body unit is completely assembled before it reaches the overhead conveyor, which carries the body over the chassis parts line. This is a bench-high conveyor with a ventilated pit beneath it, and the necessary fixtures to carry the mechanical units into alignment with the overhead body conveyor. Less labor is required because of the greatly reduced number of parts in the final assembly.

Problems connected with repairing a unitized body are identical with those encountered in the conventional all-steel body. The repair problem is therefore no more difficult or costly. It is necessary in either case to straighten out the buckled panels and box sections and gas or arc-weld in service panels, solder up and finish. In this type of construction, the damage is usually localized at the point of impact. It is extremely rare to find distortion or misalignment extending throughout the structure. In cases of an accident in which the body is damaged beyond repair, the problem is about the same as on the conventional car . . . a new body unit and repair work on the chassis frame in one case, and a new unitized body in the other, with as many detachable parts as possible being salvaged.

Immediate future developments of this construction will be concerned mainly with further simplification in detail design, in addition to the constructional refinements indicated from experience with experimental cars.

THE CAR FRAME

Be a Separate Unit?



Excerpts from a paper

by N. T. DIETRICH
Midland Steel Products Co.

■ Detroit, Sept. 24

(*Paper entitled "Frames"*)

THE frame is a logical sort of thing. It is the product of evolution, and has been used by man through the ages to carry a load. From time immemorial vehicles have been built with frames supported by axles which in turn are supported by the greatest of all inventions—the wheel.

When the automobile was brought into being in the late years of the last century and began to flourish and grow into a great industry in this century, the engineers most naturally followed those fundamental lines: frame, axles, and wheels, on which was mounted a body and those basic units, engine, gear box, and so on. Logic implies a following of the most natural processes of thought, and anything that is logical will bear the test of time.

Listing briefly the advantages of the separate frame, we come almost at once to the realization that the advantages are not only mechanical but also economic; the two become so entwined that it is rather difficult to separate them.

1. The frame gives an exceedingly strong and rigid foundation for the automobile.

2. This strength and rigidity are supplied at a minimum cost.

3. These properties are difficult and therefore expensive to obtain in the composite body and frame construction or in the so-called frameless car construction.

4. The accuracy required in the car of today for front wheel mounting is easily attained and maintained through the long life of the car.

5. The properties of the frame are such that the automobile in service will be better able to withstand hard usage and the strains and shocks of minor bumper collisions and other accidental impacts.

6. In case of serious collision, the frame is capable of being either straightened or replaced, with the body and sheet metal being treated separately, at less cost than in the case of the frameless car.

7. The frame as such lends itself in design to different wheel bases for various models the manufacturer may wish to produce. This interchangeability is important, of course, from the angles of tooling cost and production cost.

8. The frame is obviously the logical adjunct of the convertible or phaeton car.

One more great factor which the frame favors is the silencing of the car. With the insulation, usually rubber, used between the frame and the body by nearly all manufacturers employing the separate frame, the car is most effectively and economically insulated from tire and road noises, and the use of dumb-dumb or silencing materials is held to a minimum.

Weight saving, we are informed, is obtained by the elimination of the frame. However, this opens the consideration of what we may sacrifice to obtain this weight saving. We believe the frame offers maximum strength and stiffness at minimum cost; and we do not think whatever amount of strength and stiffness is needed can be obtained in integral body structure at comparable cost. A survey of present cars or prewar cars would indicate that the great majority of our automotive engineers have reached the logical conclusion that the frame gives the qualities sought, in the quantities sought, at the lowest rate of cost.

Few of us realize the tremendous advancement made in the design of the frame with body strength and accuracy in mind. Today's frame is a far superior structure to its antecedent of the early cars. The use of the X-member marked the advent of a new frame in the annals of car design. Torsional strength was increased to such a point as to almost defy comparison with the old ladder type frame with side rails joined by simple straight or alligator type cross members. Improved car riding and performance factors more than justified the increases in cost and weight. In recent years some designers have given up the X-member, and adopted a full length boxed side rail with unusually strong front cross members to facilitate the mounting of engine, radiator, and, of greater importance, the front wheel suspension control arms and shock absorbers. This modern frame sells at a very low price.

We are often reminded that many European cars as well as some cars here in America have been built without the conventional frame or perhaps without a frame at all. Generally speaking these cars were small and of short wheelbase as compared to the standard car of minimum wheelbase produced by our larger manufacturers. These cars were also designed for the absolute minimum weight and small horsepower. Additionally, European economic conditions and standards of living are quite incomparable with those in this country.

The economic factor of the automobile assembly cannot be overlooked. The facility of putting a frame down an assembly line

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Discussion

WILLIAM B. Stout, Consolidated Vultee Aircraft Corp., and Graham-Paige Motors Corp., pointed out that, assumptions accepted, each speaker was correct. However, he revealed his own lack of sympathy with any design that is "like a bridge truss from here to there . . . has two iron bars running the rest of the way."

Don Sherman, A. O. Smith Corp., challenged Mr. Ulrich's statement that the chassis frame did not increase in efficiency from 1926 to 1940. Torsional rigidity of the average frame, he said, has increased 1500% with a mere 30% weight increase. By 1940 the frame contributed 40% of the vehicle's total rigidity. He believes efforts should be directed toward better connections between body and frame, better joints, increased overall stiffness and control of noise.

In reply to a question by A. G. Herreshoff, Chrysler Corp., Mr. Ulrich reported that the unitized vehicle presents no problem of corrosion, since box section rails under the floor are coated with a welding primer, and the rest of the body is bonderized.

SAE President James M. Crawford, General Motors Corp., emphasized the importance of new frameless developments in keeping other companies on their toes, but pointed out that there is strong economic justification for use of the frame because it makes possible the mounting of commercial bodies on passenger car chassis, or modifications of the passenger car chassis. In addition, he said, on many occasions the export market demands stripped chassis.

Finale of the debate was an attempted comparison of torsional stiffness, abandoned when it was discovered that methods of measure were widely divergent.

Automotive Progress Seen

Digest of talk

by A. T. COLWELL
Thompson Products, Inc.

(Summary of ideas expressed by Mr. Colwell in his talk on "Future Automotive Trends on the Ground and in the Air")

■ So. California, Nov. 15

ALONG transportation lines, the piston engine has served for four decades, but we are now in the process of intensifying our interest in jet propulsion and the turbine. The latter two, however, will be short lived due to the introduction of atomic power...or so the armchair theorists would have us believe.

Radical changes in passenger car design will not come quickly – at least in volume production models.

Beginning with the models currently being announced, about three model changes will be required before the public, its imagination stimulated by artists' dreams, will observe any appreciable change. The car owner, incidentally, would like a low priced automobile with economy, comfort, eye appeal, good performance, more gadgets, and more visibility. All these features combined are not compatible with the low price. What he will probably get is a smaller, lighter car and a smaller, lighter engine with fewer cylinders.

Small, cheap European cars never have been, and probably will not be, popular in the United States. People in the higher income brackets will want a larger, luxuriously styled car, and since these cars will be traded in after one or two years service, they will be available to the lower income bracket people who, for the most part, prefer the space, style, and easily replaceable parts of American-made cars.

Aircraft Progress

While the automobile has been more or less dormant during the past four years, the airplane has advanced with tremendous impetus.

Some of the items which the public wants from the airlines are safety, dependability, speed, comfort, and low fare.

A few of the instruments which can be incorporated in transport planes to increase safety are the collision indicator, storm indicator, light weight radar, and automatic range finder. These instruments and others besides the ones already in use could be applied only to the large transports since they are weight-and-space-consuming. Small commercial and sport planes could not afford such an elaborate flying laboratory.

Dependability demands, among other things, an airport adequate both in proper equipment to maintain flights and in convenience of location. Since cities were built first, the problem of conveniently locating a commercial airport is a hard one. Cleveland is planning a freeway which will provide a fast route to the field... cross streets will be eliminated by the overpass system. Los Angeles is contemplating a similar scheme.

Remoteness is no longer a matter of miles; it is a matter of time and cost. Up to a certain point, airline profits are proportional to the time necessary for the flight, which accounts for the tendency toward increased transport speeds.

Short trips provide a greater percentage of total fares than long trips. As a result, it would probably be better for the majority of transports to be of the conventional coach variety with adequate chair comfort and facilities. Luxury liners and sleeper planes could be maintained for those persons who want to "ride in style" or who want the comfort of a place to sleep on long trips.

Airlines should reach for the mass market. It is claimed that for national security there should be at least 5000 transport planes in service . . . with fares at 3¢ per mile per passenger. In general, the indirect costs for bus transportation represent about 1/6 those of the airplanes. Air travel costs could be reduced if the Civil Aeronautics Board would relax a little its rules limiting plane take-off capacities (the air forces have exceeded by far the load limits imposed on civilian traffic). Mass production methods, in this case mass passenger traffic, would also have a tendency to reduce fares.

Since the close of the war has apparently stopped the fevered search for new and better aircraft designs, what will happen to technical progress in airplanes? Aircraft companies will do their part with the capital they have available, but the airlines must also keep up to date. One suggestion is to leave airmail rates alone. Since efficient airline management is constantly finding the means of reducing costs, why shouldn't it maintain a modest percentage of profit and turn the remainder into research for the betterment of air traffic? Let's try lend-lease at home.

Discussion

In reply to a question about the proposed freeway from Cleveland to the airport, Mr. Colwell reported that for maximum speed, all intersecting roads will be overpassed. Discussing potential effects of the atomic bomb, he emphasized the difficulty of any prediction on the subject at this time, but suggested that automobile and aircraft manufacturing might be driven underground.

Frame Car

cont. from preceding page

for the attachment of body and parts is of great importance. This facility reflects in lower assembly costs, as the men are working in normal upright positions.

The weight of a frame may be considered synonymous with its strength. Strength is where it is needed and weight lies close to the ground, lowering the center of gravity, favoring driving safety. Greater emphasis should be placed on the desirability of tying in the design of the frame with that of the body. The point in the chassis considered by engineers for many years as most critical is that at the dash line. The frame offers a great deal of strength and rigidity in this area, but a careful study should be made, as we have said, of the possibility of enhancing this strength by overall consideration of design.

Underbody structure of the average automobile body is rather simple. Complicating the understructure by incorporating sections to simulate or equal frame strength greatly alters the picture. Collision damage is something to be considered by the manufacturer as it affects his service picture.

There are few items sold to the public that are as highly competitive as the automobile. This means that the economic angle of production assumes gigantic proportions: giving the most satisfactory vehicle from the operational and good looks standpoint, with the consideration of cost paramount. Thus our problem is still complicated. If and when it becomes a fact that the car can be as efficiently built with the frame eliminated as it can with the present design of separate frame, then the frame as such will disappear.

Frame manufacturers must stand on the overall economic value of their product. They must stand on their ingenuity and the application of their special skill in their field. They must stand in competition with each other, to give in the final analysis the biggest dollar's worth that it is possible to give.

Over the Wing Is Out For Postwar Fueling

Digest of a paper

by C. S. BRANDT
and
W. C. WOLD
Consolidated Vultee Aircraft Corp.

■ So. California, Oct. 4

(Paper entitled "Some Aspects of Under-Wing or Pressure Refueling")

POINTING out that a majority of airplane operators favors under-wing or pressure refueling for postwar planes, Mr. Brandt emphasized the importance of immediate cooperation on fueling problems by aircraft companies, commercial operators, airport designers, and all other agencies in any way connected with aircraft and flight. Important jobs for their collaboration are establishment of standards, dissemination of information, and making of recommendations to the industry.

Dissatisfaction with present refueling methods, he said, is based on:

1. Fire hazard inherent to a system which transfers combustible liquids from closed to open systems.
2. Slow delivery which makes refueling a much longer process than it could and should be.
3. Strain on wing leading edges.
4. Inaccessibility.
5. Complication of filling process necessitated by safety requirements.
6. Excessive manpower and equipment necessary for the operation.

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NEW Horizons Plotted at SAE National Air Transport Meeting

SCORES of basic engineering problems, crying for speedy solution, challenged engineers of supplier industries when the first postwar SAE National Air Transport Engineering Meeting drew more than 500 engineers and executives to Chicago, Dec. 3 to 5. Throughout the eight sessions, with their 15 prepared papers, airline operators outlined major engineering tasks, which, most agreed, can be achieved only through the type of cooperative effort which the Society performed so magnificently during the past war emergency.

Most fundamental of the engineering tasks outlined were:

- Establishment of a multi-strata block signal system to control air traffic over airports and along transcontinental and overseas air routes. The analogy of railroad block signal systems was frequently repeated, although speakers, chairmen, and discussers agreed that by comparison the two dimensional land transportation systems are mere child's play.
- Improvement of aids for all-weather aerial navigation.
- Facilitating cargo loading and unloading, to prevent wastage of time the airplanes must sit on the ground.
- Refrigeration of perishable cargoes.
- Cockpit engineering.
- Safety engineering.

Kenneth Campbell, Wright Aeronautical Corp. research engineer, was awarded the 1944 Manly Memorial Medal for his paper on "Engine Cooling Fan Theory and Practice," by Norman N. Tilley, chairman of the Memorial Board. The occasion was the Tuesday evening banquet, when more than 400 members and guests heard Dr. Sanford A. Moss, General Electric Co. consulting engineer, speak on "Gas Turbines – Yesterday, Today, and Tomorrow." Charles Froesch, chief engineer of Eastern Air Lines, was toastmaster. Mr. Campbell had just returned from Europe on a Government engineering mission.

Dr. Moss, long an advocate of improved powerplants, declared that the gas turbine, in its two basic forms and either with or without a hookup with the conventional reciprocal engine "is here today and must be considered as a factor in tomorrow's airline operation."

Host of the meeting was the Chicago Section, under the chairmanship of Emil O. Wirth. General chairman was Jack E. Kline, who was ably assisted by Ray D. Kelly, chairman of the Section's Program & Meetings Committee; SAE Vice-President William Littlewood; Raymond Peterson, registration and reception chairman; Treasurer H. S. Manwaring, and others.

The registration left something to be desired in so far as representation of supplier companies was concerned. Few of the hundreds of companies supplying airlines were represented by their engineers, and several speakers and session chairmen pointed out that many manufacturers had missed a great opportunity in not having learned at first hand the need of the airline operators for improved equipment.

"These problems are on top of us today. We need all the help we can get, or we'll be snowed under and will be forced to compromises which may deter progress," was the way one session chairman stressed

Wins 1944 Manly Medal . . .

Recipient of the twelfth Manly Memorial Medal, Kenneth Campbell, manager, Wright Aeronautical Corp. research division, received the coveted award at the SAE National Air Transport Engineering Meeting dinner on Dec. 4 in Chicago.

Kenneth Campbell

The award was made by Norman N. Tilley, Studebaker Corp., chairman of the board of awards, for Mr. Campbell's paper "Engine Cooling Fan Theory and Practice." The medal is in honor of Charles M. Manly, deceased, a former president of the Society, and a pioneer in aircraft powerplant development.

In accepting the award, Mr. Campbell was generous in his appreciation of the collaboration of his colleagues in aerodynamic and thermodynamic research, and other engineers and technicians in powerplant development.

"It is largely this unsung level of engineering personnel of the airlines, aircraft, engine, propeller, and accessory manufacturers which, expecting no acclaim, is turning out the progress and the real values."

The SAE National Air Transport Engineering Meeting, Dec. 3 to 5, at the Edgewater Beach Hotel, Chicago, was the first full scale national meeting of the newest of the Society's 11 professional activities. It was cosponsored by the Chicago Section.

The general committee in charge of the program consisted of Jack E. Kline, Standard Oil Co., chairman, SAE Vice-President William Littlewood, vice-president of American Airlines, Inc., and Emil O. Wirth, Bendix Products Division, chairman of the Chicago Section. Ray D. Kelly, United Air Lines, served with Messrs. Kline and Wirth on the Program Committee; Raymond Peterson was chairman of the Registration and Reception Committee, Treasurer H. S. Manwaring was in charge of the banquet, and Robert Temple was chairman of the Publicity Committee.

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The opening session was presided over by Mr. Littlewood, who introduced M. F. Vanik, Boeing Aircraft Co., who read his paper on Flight Engineer Station Design, and Capt. H. J. Chase, Pan American Airways, Inc., on Control Decks for Long Range Aircraft.

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Mr. Kelly presided over the afternoon session, where a paper by John G. Borger and R. O. Jacobsen on Emergency Equipment for Overwater Transport and another by Frank R. Canney, Boeing Aircraft Co., on Provisions for Overwater Operation were read.

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Chairman Robert Aldrich, director, Minneapolis-St. Paul Metropolitan Airports Commission, introduced the two speakers of the evening session. They were Albert F. Heino, United Air Lines, who spoke on Airport Terminal Design, and Harry S. Pack, P-V Engineering Forum, whose paper was Latest Developments in Airline Ground Servicing Equipment.

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Tuesday's sessions were opened by Chairman R. L. Anderson, Chicago & Southern Airlines, who introduced Lt.-Col. David W. Long, Air Transport Command, AAF, who read his paper Air Transport Command Cargo Loading Experiences, and M. B. Crawford, United Air Lines, Inc., who presented The Airlines' Air Cargo Problems.

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Chairman Charles Froesch, Eastern Air Lines, Inc., introduced R. W. Rummel, Transcontinental & Western Air, Inc., whose paper was Passenger Cabin Design from the Airline Viewpoint, and Dr. Howard K. Edwards, Eastern Air Lines, Inc., who spoke on Psychological Requirements of Aircraft Passenger Cabin Design, at the afternoon session.

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Mr. Froesch was also toastmaster at the banquet, where SAE President

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James M. Crawford, General Motors Corp., and Dr. Sanford A. Moss, General Electric Co., were the speakers.

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G. A. Page, Jr., Curtiss-Wright Corp., was chairman of the Wednesday morning session, and introduced Bernard L. Messinger, Lockheed Aircraft Corp., who spoke on Refrigeration for Air-Conditioning Pressurized Transport Aircraft, and Raymond A. Rugge, Curtiss-Wright Corp., on Fluorescent Cabin Lighting for Transport Airplanes.

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Chairman S. S. Stevens, Trans-Canada Airlines, was in charge of the Wednesday afternoon session and presented Capt. S. P. Saint, American Airlines, Inc., who spoke on A System Specification for Air Navigation and Traffic Control. He was followed by Capt. Haakon G. Gulbransen, Pan American Airways, Inc., whose paper was entitled Transoceanic Air Navigation.

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Mimeographed copies of papers by Messrs. Vanik, Chase, Borger and Jacobson, Canney, Heino, Pack, Long, Crawford, Rummel, Messinger, Rugge, Saint, Edwards, and Gulbransen are available from the Special Publications Department, Society of Automotive Engineers. As in the case of all SAE Meetings Papers submitted to SAE Headquarters, these papers are priced at 25¢ to SAE Members and 50¢ to Non-members, postpaid.

the immediacy of the engineering tasks the airlines face.

The wide scope of the program, the excellence of the papers, and the vigor of the discussions belied the tender age of the SAE Air Transport Engineering Activity – just two years old.

Transcontinental and international air traffic already has reached such dimensions that airways, airport, and navigational control has become the major problem facing all operators, a number of speakers concluded.

Today commercial airlines are spanning continents and oceans with a volume of traffic which creates hazards – a condition demanding prompt solution in the interest of the growth of the nation's youngest but lusty industry, a number of speakers on different technical subjects agreed.

One of these men, an executive with a rich background of piloting, called for vastly improved methods of handling the volume of movements at airports, explaining that airplanes still are required to make the same instrument approaches used when instrument flying was first inaugurated. Today's traffic control, he said, is handicapped by the "same fundamental limitations as in 1930."

"Every known principle of safety engineering, with the cooperation of engineers of various skills, and the best experiences of the military air transport experts, must be called upon to give us a flexible system to safely coordinate air traffic and make and maintain the required separations," he said, as he outlined in detail this paramount engineering problem. An element will be to develop radar far beyond its present limitations despite the magnificent developments in electronics which so ably aided the United Nations to win the war," he said.

As he sees the problem, self-checking communications devices would be needed to establish two-way channels between each airplane and the automatic control system located on the ground. He envisioned all routine clearance instructions to be carried out automatically to free the pilot to handle emergencies with his crew members. This led him to use the example of the railroad block signal system as a starting point, although he was careful in the discussion period to maintain that the system needed would transcend anything in operation today.

Transoceanic air navigation also requires serious engineering studies, another veteran executive pilot declared. "Long range flight operations," he said, "demand the most efficient and least costly navigational aids. The art of navigation has progressed to a point where these requirements can be met. But the complex duties aboard the aircraft call for engineering specialization in every field to meet today's demands.

The speaker pointed out that development of instrumentation had taken transoceanic flights from the pioneering realm of the stunt fliers. These men popularized flying. Then the airlines assayed the possibilities of establishing scheduled flights which they found to have practical commercial status before World War II. It was on the basis of this work that the vast armada of Army and Navy transports was launched as a military necessity.

In more detail, another speaker described the requirements of the flight engineer's station in the control room. Long range operation has repeatedly demonstrated the importance of this specialist, who has "been given the brush off" in so far as design of his facilities is concerned. One representative of a major aircraft manufacturer pointed out the best that had been done for this airborne engineer had been a compromise, inasmuch as the ascendency of this expert in the crew was relatively new.

His company, he said, looks to future developments in location, as well as instrumentation, with some gratification – although there is much experience to be correlated, and a great deal of engineering work ahead. The flying powerplant technician is often called upon to "double" in functioning as a pilot aid and to perform other duties not in his own line while in flight.

A review of control deck design disclosed a mass of intense engineering on this subject. Basic problem – and one most engineers contend with daily – is that dif-

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SAE Vice-President William Littlewood, right, whose Air Transport Engineering Activity produced the successful first SAE National Air Transport Engineering Meeting, Dec. 3 to 5, Chicago, with the cooperation of the Chicago Section. Below are shown, left to right, Jack E. Kline, chairman of the General Committee; Charles Froesch, chairman of the Activity's Meeting Committee, and Chicago Section Chairman Emil O. Wirth, who were among the men largely responsible for the outstanding three-day meeting

News..

..OF THE SOCIETY

BurShips Chief Lauds SAE Group For Torsional Vibration Report

VICE-ADMIRAL E. L. Cochrane, chief of the Navy Bureau of Ships, gave high praise to the Torsional Vibration Committee of the SAE War Engineering Board upon

Vice-Admiral E. L. COCHRANE
Chief, Navy Bureau of Ships

the completion of its report "Evaluation of Effects of Torsional Vibration," in a letter to President James M. Crawford dated Nov. 15.

The report, he wrote, "is in the opinion of competent engineers of this Bureau a truly monumental contribution to our knowledge on this subject," and he predicted that it would "become an authoritative reference to engineers" engaged in engine design.

The admiral commended the "immediate response of the management of the Society, the prompt organization of the committee, and the magnificent teamwork and cooperation of the industry and its individual engineers" in undertaking the task proposed by Capt. L. F. Small, USN, then attached to the Bureau.

"Consultant to the Navy"

"As a consultant to the Navy," his letter continued, this committee has rendered invaluable service, and the Bureau is unwilling to discharge it as long as there is work to be done in analyzing war casualties from torsional vibration, and reviewing the errors made under pressure of war.

"I therefore hope that you will find a way to continue the activities of this committee, which will benefit the Navy and the industry as well."

Special appreciation was expressed by the admiral to C. G. A. Rosen, chairman, "who so tactfully and skillfully guided the deliberations," to SAE Secretary and General Manager John A. C. Warner, "for his speed in organizing the committee," and to Ray C. Sackett, whom he described as "the genial and competent secretary of the SAE War Engineering Board."

The report, containing 567 8½ x 11 pages, includes numerous photographs and 134 full-page charts. It has been released for general distribution by the Navy and is available from the SAE Special Publications Department.

Members of the committee, serving under Mr. Rosen's chairmanship, were L. M. Ball, Chrysler Corp.; F. P. Porter, Fairbanks, Morse & Co.; T. C. Van Degrift, L. F. Hope and F. G. Shoemaker, General Motors Corp.; G. J. Dashefsky, U. S. Navy; S. T. Foresman, Chrysler Corp. and J. F. Millan, secretary, Caterpillar Tractor Co.

Study Plastics for Glazing

SEEKING to arrive at some criteria to guide future developments in plastics for glazing automobiles and buses, the Committee on Glazing Plastics of the SAE Technical Board has agreed that a separate safety code should be written covering these materials without disturbing the present ASA Z26.1 1938 American Standard code for safety glass.

Under the chairmanship of J. L. McCloud, Ford Motor Co., the group of 14 experts met recently in Detroit to outline the scope of its work. Sponsor of the project is R. H. McCarroll, a member of the Technical Board. Members include engineers from major vehicle manufacturers, glass companies, plastic companies, and other experts.

It appeared to the group that plastic windshields should be excluded from consideration at the present state of the art. All the known types of transparent plastic materials scratch too easily to permit the use of conventional types of windshield wipers, it was disclosed.

Representatives of plastic manufacturers were assigned the task of collating the latest data in respect to drawing up a sample code to indicate what they believe a safety code for plastic automotive glazing should cover.

They will also get together in agreement on the properties and physical characteristics of the best transparent materials. The automobile representatives will then evaluate these data from a functional viewpoint, it was agreed.

The project was undertaken not only because it was felt that transparent plastics had certain desirable characteristics, but several official indications have shown that legal authorities interested in this field of regulation wanted the possibilities explored with view of ultimate revisions in the ASA code.

Beecroft Legacy Of $2500 to SAE

A BEQUEST of $2,500 left to the SAE by Past-President David Beecroft has been accepted by the SAE Council. Mr. Beecroft's will specifies that the bequest is for 10 awards of $250 each to be awarded at the sole discretion of the SAE Past-Presidents' Advisory Committee. Mr. Beecroft expresses the hope, however, "that the awards will be made for meritorious contributions to the improvement of traffic conditions and made in consultation with the Automobile Manufacturers Association."

Following acceptance of the bequest, the Council referred to the Past-Presidents' Advisory Committee the decision as to the exact use to which the money shall be put.

W.E.B. Dinner Marks End of 4 Years Service to Armed Forces of U. S. A.

MEMBERS of the SAE War Engineering Board officially rang down the curtain on four eventful years of cooperative effort as engineering consultants to our military services with a banquet at the Detroit Athletic Club Nov. 28.

Guest of honor was J. C. Zeder, who had guided the destinies of the W. E. B. as its chairman throughout the war. Members expressed their appreciation of his efforts in a beautiful leather-bound testimonial. During the evening, members relived many of the experiences incident to the more than 120 projects completed by the Board since the fall of 1941.

Following the dinner SAE secretary and general manager John A. C. Warner presided as toastmaster and introduced D. G. Roos, vice-president of Willys-Overland Motors, Inc., who expressed the feelings of the members for the close bond of association and affection developed through the unselfish efforts of all.

"All the while I had the privilege of sitting on the War Engineering Board," said Mr. Roos, "I realized we were making history, and without being conscious of it, a bond of fellowship was being formed, unique and enduring in character. This is always so when individuals join in a common cause without self-interest and jointly succeed in accomplishing good things."

L. Ray Buckendale, member of the W. E. B. and chairman of the newly created Technical Board, presented to Chairman Zeder a resolution from the Technical Board praising the accomplishments of the W. E. B. and accepting the request of Chairman Zeder to disband it. A reproduction of the resolution went to each W. E. B. member.

In the words of the Resolution, the Technical Board formally expressed "the deep appreciation of the Society for the outstanding and meritorious engineering advisory service of the War Engineering Board to Army Ordnance, the Navy, the Signal Corps and the War Production Board in the development, manufacture and maintenance of military and civilian automotive equipment, and acknowledged the great contribution thus made to the Society's prestige by the Board and its chairman."

SAE President J. M. Crawford, also a member of the W. E. B., concluded the formal part of the program with a presentation to Chairman Zeder of a leather-bound, hand-illuminated testimonial bearing the signature of all W. E. B. members.

There followed then an old-fashioned "revival" in which every member freely bespoke his gratitude for the opportunity of having been a member of the SAE War Engineering Board.

The complete membership of W. E. B. is as follows: J. C. Zeder, chairman, Chrysler Corp.; B. B. Bachman, the Autocar Co.; D. R. Berlin, Allison Division, GMC; L. Ray Buckendale, Timken-Detroit Axle Co.; R. E. Cole, Studebaker Corp.; A. T. Colwell, Thompson Aircraft Products Co.; J. M. Crawford, General Motors Corp.; J. H. Hunt, General Motors Corp.; F. F. Kishline, Nash-Kelvinator Corp.; R. H. McCarroll, Ford Motor Co.; Arthur Nutt, Packard Motor Car Co.; C. R. Paton, Ford Motor Co.; L. S. Pfost, The Massey-Harris Co.; D. G. Roos, Willys-Overland Motors, Inc.; C. G. A. Rosen, Caterpillar Tractor Co.; E. H. Smith, Packard Motor Car Co.; R. R. Teeter, Perfect Circle Co. and Louis Thoms, General Motors Corp.

SAE staff members T. A. Bissell, Don Blanchard and R. C. Sackett also attended the dinner.

SAE Group Undertakes Study of Aero Bearings

DIFFICULTY of the aircraft industry to obtain satisfactory bearing and lubricant combinations to meet service conditions throughout the complete range of world-wide temperature and flight altitude ranges generated a new project on this subject by the SAE Aeronautics Division.

After a discussion of various phases of the problem, three subcommittees were named by Chairman Robert H. Richolt, Lockheed Aircraft Corp., Nov. 16, in Los Angeles.

The group of 21 aircraft, bearing, and lubrication experts which explored the general problem and outlined the scope of the work agreed that both the bearing and lubricant must be improved to meet today's global air transport servicing needs.

Want Better Sealing

For example, they reported that a better sealed bearing is required for aircraft controls. Due to inadequate sealing, bearings pick up metallic chips and other debris during the fabrication of the airplane and in subsequent operation. This, combined with inadequate corrosion resistance, causes undue friction and in many cases complete freezing of bearings forces excessive loads on the control systems.

Due to inadequate stability, it was disclosed, the lubricant tends to break down under high temperatures and then bleed out from the bearing. The bearing then corrodes and fails.

It was reported that airplane manufacturers had found cost of servicing bearings excessive. Failures in inaccessible places, particularly, require costly maintenance. Generator bearings have frozen because of the loss of lubricant after 100 hr. Airline operators and aircraft manufacturers want a lubricant which will lubricate at −45 to −50 F in sealed bearings for service life of at least 10,000 hr, rather than the present approximate 100 hr.

Servicing Cost High

It was said that the cost of servicing and replacing a bearing during operation may be 100 times the cost of the bearing itself.

The first problem of the committee is to determine true temperatures at which bearings operate in different locations of an airplane. These vary widely depending upon the particular zone in the airplane where the bearing is located.

Airplane bearings, according to reports of one company, reached 175 F in North Africa where the bearing was located in a small enclosed area. Near the top of a wing a temperature of 181 F was recorded by another company.

A subcommittee, headed by F. B. Bolte, North American Aviation, Inc., was named to study temperature zoning the airplane. His associates are Ralph Ellinger, Transcontinental & Western Airlines, K. J. Older, Northrup Aircraft, and a representative of Pan American Airways, to be designated.

To Revise Specs

Another subcommittee on bearings was appointed to revise and improve bearing specifications to meet today's demands. Among the assignments of this group will be writing specifications to improve the cor-

SAE Coming Events

National Meetings

ANNUAL MEETING & ENGINEERING DISPLAY, Jan. 7-11, Book-Cadillac Hotel, Detroit

AERONAUTIC (Spring), April 3-5, New Yorker Hotel, New York

SUMMER MEETING (Semi-Annual), June 2-7, French Lick Springs Hotel, French Lick Springs, Ind.

TRACTOR, Sept. 11-13, Hotel Schroeder, Milwaukee.

AERONAUTIC MEETING and AIRCRAFT ENGINEERING DISPLAY, Oct. 3-5 Biltmore Hotel, Los Angeles

Baltimore – Jan. 10

Engineers Club; dinner 6:30 p.m. Solid Fuel Injection for Automotive and Aircraft Powerplants. Speaker to be announced.

Cincinnati – Jan. 10

Alms Hotel; dinner 6:30 p.m. Fuels and Lubricants – L. Raymond, Socony-Vacuum Oil Co., Inc.

Cleveland – Jan. 14

Carter Hotel; dinner 6:30 p.m. Oil for Post-War Car, H. L. Hemmingway, Pure Oil Co. Developments in Chassis Lubrications – John Zimmer, Socony-Vacuum Oil Co., Inc.

Dayton – Jan. 16

Van Cleve Hotel; dinner 6:45 p.m. Specialized Photography Applied to A.A.F. Engineering Problems – Major Thomas, Air Technical Service Command.

Detroit – Jan. 21

Horace H. Rackham Educational Memorial Building; meeting 7:30 p.m. Fundamental Discussion of Bus Design – H. A. Flogaus, vice-president of engineering, J. G. Brill Co.

Metropolitan – Jan. 17

Pennsylvania Hotel, New York; meeting 7:45 p.m. Gear Oils – P. V. Keyser, Jr., manager, Research & Development Laboratories, Socony-Vacuum Oil Co., Inc. Greases – W. G. Ainsley, director, Engineering Laboratories, Sinclair Refining Co. Significance of Octane Numbers – Prof. H. W. Best, Yale University. Gasoline Additives – J. R. Sabina, Petroleum Chemicals Section, E. I. du Pont de Nemours & Co. War Experience with Heavy Duty Oils – Lt.-Col. R. E. Jeffrey, U. S. Army.

Milwaukee – Jan. 4

Milwaukee Athletic Club; dinner 6:30 p.m. Aviation War Gasoline and Its Effect on Future Motor and Aviation Fuels – William Holaday, Socony-Vacuum Oil Co., Inc.

New England – Jan. 8

Location to be announced. Postwar Highway Transportation Problems – Col. F. C. Horner, director, Field Operations Section, General Motors Corp.

Northern California – Jan. 8

Engineers Club, San Francisco; dinner 6:15 p.m. Diesel Developments and Applications in Germany – Com. Carl J. Vogt.

Northwest – Jan. 4

Five Point Inn, Tacoma; dinner 7:00 p.m. Spark Plug – Automotive and Aircraft – What They Are – What They Do – What They Require – Robert M. Ward, special representative, Champion Spark Plug Co.

Oregon – Jan. 4

Imperial Hotel; dinner 7:00 p.m. Stairways for the Highway – Julius Gaussion, Silver Eagle Transportation Co. Heavy Duty Transmission and Differential Lubricant – Irving E. Person, The Texas Co.

Pittsburgh – Jan. 22

William Penn Hotel; luncheon 12:15 p.m. Military Experiences with Fuels and Lubricants – C. J. Livingstone, Gulf Research & Development Co.

St. Louis – Jan. 15

Congress Hotel; dinner 6:30 p.m. Fuels and Lubricants in Jet Propulsion Engines – A. J. Nerad, General Electric Co.

Southern California – Jan. 11

Biltmore Hotel, Los Angeles; meeting 7:45 p.m. The Rocket Powerplant – Maurice J. Zucrow, staff engineer, Aerojet Engineering Corp.

Spokane Group – Jan. 11

Desert Hotel; dinner 7:00 p.m. Speaker and subject to be announced.

Syracuse – Jan. 21

Museum of Fine Arts; dinner 6:30 p.m. Hydraulic Transmissions — A. H. Deimel, assistant chief engineer, Spicer Mfg. Corp.

Washington – Jan. 10

Dodge Hotel; meeting 8:00 p.m. Postwar Highway Construction in Washington, D. C. – Joseph D. Arthur, Jr., assistant engineer, Commissioner of District of Columbia.

Western Michigan – Jan. 24

Occidental Hotel, Muskegon; meeting 7:45 p.m. Speaker – Charles Chayne, chief engineer, Buick Division, General Motors Corp.

rosion resistance and sealing performance of the bearing. This subcommittee will also develop a standard test procedure for evaluating these bearings.

This subcommittee on bearings will be headed by H. L. Potter, Fafnir Bearing Co. Don Haussam, Western Airlines; H. A. Murray, The Texas Co.; T. C. Hill, Glenn L. Martin Co., and representatives from Pan American Airways and a plain bearing manufacturer, will be members.

The problem of developing improved lubrications, with the hope that a single lubricant might emerge, was referred to a special subcommittee on this subject. The price, it was agreed, would be a negligible factor if a single lubricant could be developed. The group was also asked to develop a standard test procedure for evaluating lubricants.

Chairman of the subcommittee on lubricants will be D. H. Moreton, Douglas Aircraft Co., Inc., and he will be assisted by Bert Folda, General Petroleum Co.; William A. S. Wright, Union Oil Co.; L. Mittleman, Tide Water Associated Oil Co.; D. N. Harris, Shell Oil Co., and a representative of an eastern petroleum refining company.

Mr. Richolt heads the steering committee, on which will serve Messrs. Moreton, Bolte, and Potter, the subcommittee chairmen, and Messrs. Ellinger and Folda.

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SAE JOURNAL FIELD EDITORS

Baltimore – Webster H. Francis, Jr.
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Canadian – Warren B. Hastings
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Milwaukee – L. A. Wilson
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No. California – J. H. MacPherson
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Oregon – No Appointment
Peoria – No Appointment
Philadelphia – Laurence Cooper
Pittsburgh – No Appointment
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San Diego Division – Grant B. Hodgson
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Syracuse – No Appointment
Texas – No Appointment
Washington – E. K. Owens
Western Michigan – No Appointment
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Colorado Group – No Appointment
Mohawk-Hudson Group – No Appointment
Salt Lake Group – David Brown
Spokane Group – No Appointment
Twin City Group – George S. Johnson
Virginia Group – No Appointment

Rambling Through Se

MORE than 150 members and guests attended **SOUTHERN CALIFORNIA SECTION** Air Transport Engineering Meeting, Nov. 15. A. T. Colwell, vice-president of Thompson Products, Inc., discussed "Future Automotive Trends on the Ground and in the Air," drawing certain parallels between the automobile and aircraft industries, and mapping out general trends. (See p. 32 for summary.) Chairman Thomas Wolfe, vice-president of Western Air Lines, Inc., commented on the discrepancy between improvements in airplane cargo space, carrying capacity, etc., and developments in ground transportation, field facilities, passenger handling and cargo packaging. There is also a lag, he said, between designers' excellent vision and the working out of details. He pointed out that if the full value of the airplane is to be realized, all types of engineering concerned with roads, airports, and other related factors must cooperate more closely.

Mr. Wolfe told the meeting that SAE war activity has been responsible for 966 completed projects covering ordnance and engineering.

Members of the **ST. LOUIS SECTION** are considering chartering an airplane to transport them to the Annual Meeting in Detroit.

Speaking to **SYRACUSE SECTION** on the subject of "Silicones," Nov. 12, Dr. Eugene G. Rochow, General Electric Research Laboratories, illustrated the chemical relationship between the silicones and their raw materials, silica and various organic compounds. Unique materials of the silicone family, with new combinations of

Dr. E. G. Rochow, guest speaker (center), L. L. Otto, Section chairman (left), and J. D. Williams, vice-chairman, shown at dinner preceding Syracuse Section meeting, Nov. 12

physical properties, have been applied to products such as electrical insulations, gasket materials, water repellent treatments, and so on. An interesting question period following his report concerned the possibilities of applying silicones to specific problems and general fields of engineering.

SAE Council has authorized **PHILADELPHIA SECTION** to add to its elective offices two new vice-chairmanships, one to represent fuels and lubricants and one for aircraft.

Wallace Linville, Acelin Co., spoke at the **SAN DIEGO DIVISION** dinner meeting on Nov. 26 on "Conversion to and Utilization of Present-Day Oils and Gasolines." Mr. Linville, a past-chairman of the Southern California Section and a specialist on petroleum, discussed the related development of oils, fuels and engines to today's high performance combination, and stressed the importance of training operators of automotive equipment to use this combination intelligently.

High octane rating, according to Mr. Linville, does not necessarily indicate a superior fuel or insure easy starting and smooth power at all speeds. A comparison of adjusted spark advance required for detonation-free operation at various speeds with the normal unadjusted spark advance required, he said, is a better criterion of gasoline performance, and this test has led to the development of current high performance fuels.

A pure mathematical idea was applied to a very practical activity by Lt.-Com. William S. Everett, who spoke to the **NORTHERN CALIFORNIA SECTION**, Nov. 12, on "The Theory of Probabilities Applied to the Manufacture of Diesel Engines." According to Com. Everett, experience has shown that engines using parts manufactured outside of engineering drawing tolerances have performed very satisfactorily in service. Thus, he said, drawing tolerances are unrealistic, failing to represent permissible tolerances from an operation standpoint, the final criterion for engine manufacture. Taking advantage of the theory of probability,

Section Reports

Com. Everett outlined a method of measurement that will give tolerances that are two to four times larger than the specified engineering drawing tolerances, but equal to or slightly smaller than the tolerances actually found in diesel engines giving satisfactory performances in the field.

Although the theory has not yet been widely applied in the diesel-engine industry, he said, there is considerable opportunity for its use, and it should result in a large saving to the industry.

The **MID-CONTINENT SECTION** has been authorized to create the office of vice-chairman representing transportation and maintenance. Carl Tangner has been appointed to the post for the remainder of this section year; in future the office will be elective.

Fred E. Moskovics, industrial consultant, A. O. Smith Corp., one of the colorful pioneers in the automobile industry, spoke to 300 members and guests of the **CHICAGO SECTION** Passenger car Meeting, Nov. 13, on "Cars and Men of Old and Their Challenge to You." (See p. 17, December *SAE Journal*.)

"How to stay on top of pseudo-solid and pseudo-liquid terrain" was discussed by R. D. Evans, manager of tire design research, Goodyear Tire and Rubber Co., at Nov. 12 **DETROIT SECTION** Truck and Bus Activity meeting. Mr. Evans declared that the optimum point in tire performance is reached by dividing the distortion which takes place, between the tire and the soil. He made specific recommendations regarding tires suitable for various types of operations. In sand, he said, tires designed for extremely low pressures with high deflection and shallow, rounded thread design should be used – and, also, all-wheel drive. With such equipment, he declared, it is now possible to negotiate any stretch of dry sand with motor vehicles. In mud, on the other hand, performance has not been so meritorious, although suitable thread design can do much to build up the tractive factor.

At Detroit Section Nov. 21 meeting, Guy J. Bates, industrial engineer on the manufacturing staff of General Motors Corp., pointed out that recent developments have brought into use a new technique useful to the production engineer – a measuring stick to evaluate the effctiveness of a shop operation in reference to its use by labor. This involves, he said, a movement concept which has somewhat thrown out the older time concept. As a tool for eliminating unnecessary movements, he said, it is actually an answer to the time problem, although in his opinion much more could be done by increased attention to the areas of product design and manufacturing planning departments.

Smaller, more powerful engines probably will be one of the basic improvements in future automobile design, Joseph Geschelin, Detroit Editor, Chilton Co., told **MILWAUKEE SECTION** meeting, Dec. 7. Speaking on "Motor Cars of Today and Tomorrow," Mr. Geschelin said that any generalization about 1946 models is difficult because some producers have made no changes in design, others have made a great many, and some have changed sheet metal and appearance features only. He pointed out, however, that rear end engine mounting, frameless cars and automatic transmissions are definite possibilities, given the impetus of competition.

An interesting and educational talk on India, Burma and China was presented at **WESTERN MICHIGAN SECTION** Nov. 29 meeting by a wartime consultant to the U. S. Government. Errol J. Gay, Manager of Ethyl Corp.'s Fleet Division, described his experiences with almost insurmountable problems of excess rainfall, lack of food, poor roads, dirt, difficulty of transportation and dearth of sanitation.

Bernard M. Sznycer's SG Mark VI Helicopter

Bernard M. Sznycer discussed at **CANADIAN SECTION** Nov. 21 meeting the problems which confront the helicopter designer. Although the principles upon which helicopter design is based are centuries old, he said, nevertheless successful application has had to await a myriad of necessary mechanical engineering developments.

SAE Gains New Group

NEW addition to Society Groups is one in the Williamsport, Pa. area. Geographically, the Group includes eight counties largely within the watershed of the Susquehanna River, three of which have been ceded by the Philadelphia Section. Within the territory are Pennsylvania State College, Bucknell University and Susquehanna University, as well as a number of automotive concerns.

Name for the new Group will be recommended for the Council's approval by a conference of the Sections Committee and the officers of the Group. A series of meetings is being planned which will cover subjects of interest to all members.

There are now 35 members in the Group. Temporary officers are Albert L. Brucklacher, chairman; William H. McQuiston, secretary, and G. Allen Creighton, treasurer.

Ask Continuation of SAE Aid

THE advisory services of the SAE Tractor War Emergency Committee to rubber, farm equipment, and allied industries was of such great value during the war period that representatives have asked the committee to continue its cooperative engineering work.

At the Nov. 29 meeting of the Committee in Chicago representatives of the several industry groups expressed appreciation on behalf of their associates, and official requests will be made to the SAE Technical Board to continue the TWEC.

The committee, headed by Albert W. Lavers, Graham-Paige Motors Corp., has worked on the problem of wartime simplification of the number of tire sizes for tractors, has cooperated with the Tire & Rim Association on the problem of reducing to a practical minimum the types and sizes of rims, and has undertaken an extensive study of tractor fuels.

The group is composed of 14 members and 17 consultants, representing 12 tractor and farm implement companies, eight major tire and rubber manufacturers, several other interested manufacturers, and the Rubber Manufacturers Association.

Cummings Reappointed

H. K. CUMMINGS has been reappointed by President Crawford to the post of SAE Representative on the American Documentation Institute, a non-profit corporation organized in 1937 for the promotion and development of documentation in scholarly and scientific fields. Mr. Cummings' new three-year term will begin Jan. 31, 1946, during the Institute's annual meeting in Washington.

Gets Two New Members

Chairman Otto E. Kirchner of Committee S-1, Aeronautical Drafting Manual, of the SAE Aeronautics Division, has appointed H. M. Favor, Aeroproducts Division, General Motors Corp., and A. E. Gibson, Packard Motor Car Co., Toledo, as committee members succeeding William Hazlett and R. S. Kellogg, respectively.

Recently appointed executive engineer of Aeroproducts Division, Mr. Hazlett felt forced to resign from the committee. Mr. Kellogg has been transferred to the Marine Engine Division of Packard.

SAE Student Branch News

THE value of the flight testing of aircraft was discussed by P. E. R. Brice, Republic Aircraft Corp., at the Nov. 21 meeting of the College of the City of New York SAE Branch.

One of the prime functions of flight testing is to check assumptions made in design and to find design errors not apparent on the drawing board, Mr. Brice stated. He emphasized the necessity of carefully planning each flight and of informing the pilot of the value of various readings so that he is capable of using his own judgment should certain instruments fail to operate.

At the Dec. 5 meeting of the C. C. N. Y. SAE Branch Frank Walsh, Wright Aeronautical Corp., presented a paper on antidetonation injections.

During the war, Mr. Walsh declared, it was necessary to soup up existing warplanes in order to successfully meet the challenge imposed by several new enemy craft. The limit of power output from the engines was the detonation point, and continued operation at high speed was likely to blow off the cylinder heads or melt the barrels. With water injection apparatus, however, the engine might actually be operated at rates greater than maximum take-off power as long as the water would hold out.

Effects of Water Injection

Other effects of water injection are that carbon deposits fail to form, and engines run sufficiently cooler to warrant, in commercial operation, the closing of some of the cowl flaps, with the resultant reduced drag. If the water is introduced to the airstream at the supercharger intake, the cooling effect on the intake gases causes the volumetric efficiency of supercharger and engine to rise.

Commercially, the water injection apparatus, weighing about 150 lb per engine, will permit the use of lower octane fuels, effecting a considerable saving in fuel expense at the present rates.

C. W. Bloedorn, Allis-Chalmers Mfg. Co., discussed and illustrated the principles and problems of the steam turbine at the Nov. 27 meeting of the University of Wisconsin SAE Branch.

Mr. Bloedorn's presentation was preceded by the screening of a motion picture which demonstrated the operating principles of the steam turbine. The speaker then showed slides of many types of steam turbines, explained their construction, and described recent pressure and temperature developments.

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New officers have been elected to lead the SAE Branch of General Motors Institute in its current schedule of technical activities. C. C. Griffith has been voted general chairman of the Branch; Howard W. Smith has been elected vice-chairman, Section B; and D. R. Veazey is serving as Section B secretary-treasurer.

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The SAE Branch at Massachusetts Institute of Technology took an active part in the M. I. T. Victory and Science show conducted by the school from Nov. 9 – 11.

In cooperation with the members of other student professional societies, members of the Branch conducted visitors through the laboratories and facilities of M. I. T. during the three-day open house.

SAE Enrolled Students served as lecturers and guides through the Sloan Automotive Lab and described and demonstrated the powerplants for aircraft and land vehicles, turbo-superchargers, and variable pitch propellers.

Other displays in the exhibit were on gas turbines, radar, wind tunnels, flame throwers, and tanks.

At the Nov. 16 meeting of the M. I. T. SAE Branch Harvey S. Freeman was elected chairman; William N. Frederick, vice-chairman, and Merwin R. Burman, secretary-treasurer.

New Descriptive Folder

SAE Student Committee Chairman E. E. Bryant has announced the publication of a new descriptive folder which explains the nature of SAE Student Enrollment and the SAE activities of engineering students.

"It is through Student Enrollment," the folder notes in its foreword, "that the Society brings engineering students into contact with outstanding engineers and their accomplishments in the automotive industry."

Continuing, it tells who is eligible for SAE Enrollment, what the privileges of enrollment are, and how to apply for this student affiliation with the Society.

A section devoted to the organization and functions of SAE Student Branches describes the functions of these organizations and outlines the manner in which a group of SAE Enrolled Students may work toward the formation of an SAE Branch.

Copies of the new folder are available now, and may be secured by writing to the Student Committee at SAE Headquarters.

The SAE Club at Detroit Institute of Technology has been chartered as an SAE Student Branch by the Society's Council.

SAE activity at Detroit Tech has been continuous since 1930, with an average registration of 35 SAE Enrolled Students. With 550 students in the Engineering College at D. I. T. this year, many of them majors in automotive subjects, the group expects to make extensive use of its SAE organization.

New Officers

Officers of the new SAE Branch are Walter Mueller, chairman; Fred R. Dietrich, vice-chairman; Donald L. Lytle, secretary; and John J. Bruno, treasurer. Prof. L. L. Henry is serving as faculty adviser.

SAE Student Branch at Massachusetts Institute of Technology

Reading left to right, top row: G. F. Colusso, D. A. Hurter, T. G. Zsembik, R. F. Hoffman, S. S. Bushnell, Jr., R. W. Neal, R. C. Mulready, J. R. High, F. V. Fuller, M. Rafaat, J. L. Bateman, E. P. Ryan, W. Gaugh

Middle row: J. B. Chawla, C. B. Saran, R. K. Dostal, S. E. Babcock, H. F. Goelzer, N. G. Bois, H. A. Gray, W. N. Beam, G. J. Frassinelli, M. Friedman, O. F. F. Torres, P. A. Fagundes, D. M. Denzer

Bottom row: P. Borsari, Ho-sheng Hu, H. T. Huang, C. H. Ting, W. N. Frederick, Professor Dean A. Fales, faculty adviser; H. S. Freeman, J. P. Coffey, V. N. Mehta, J. F. De Souza, R. N. Da Silva Rego

Check List of SAE Meetings Papers

Here are listed those papers presented before National and Section Meetings of the Society of Automotive Engineers, which are still available in mimeographed form.

The SAE policy, in respect to mimeographed copies of these papers, is to make them available for at least one year after presentation.

The following papers, divided under four general headings for your convenience, are available at 25 cents each to SAE Members and 50 cents each to Non-Members. Ten or more mimeographed papers of any one title are available at reduced rates from the Special Publications Department, Society of Automotive Engineers, 29 West 39 Street, New York 18, N. Y.

NEW Papers This Month

Check Here	Author	Title of Preprint of Paper	Date of Presentation
_____	Canney, F. R.	Provisions for Overwater Operation	Dec. 3-5, 45
_____	Gulbransen, H. E. Capt.	Transoceanic Air Navigation	Dec. 3-5, 45
_____	Heino, A. F.	Airport Terminal Design	Dec. 3-5, 45
_____	Johnson, S. Jr.	Air Fixtures and Air Controls	Jan. 7-11, 46
_____	Long, D. W. Lt. Co	Air Transport Command Cargo Loading Experience	Dec. 3-5, 45
_____	McCain, G. L.	Engineering of Involute Splines	Jan. 7-11, 46
_____	Messinger, B. L.	Refrigeration for Air Conditioning Pressurized Transport Aircraft	Dec. 3-5, 45
_____	Mock, F. C.	Engineering Development of the Jet Engine and Gas Turbine Burner	Jan. 7-11, 46
_____	Saint, S. P.	A System Specification for Air Navigation and Traffic Control Development	Dec. 3-5, 45
_____	Smith, L. H.	The Motor Coach of the Future	Jan. 7-11, 46
_____	Super, R. K.	Review of Brake Designs and Methods of Rating Brakes for Commer'l Automotive Vehicles	Jan. 7-11, 46
_____	Sweeney, W. J. Kunc, J. F., Jr. Morris, W. E.	Aircraft Engine Induction System Deposits	Jan. 7-11, 46
_____	Tausig, W. A.	Retirement of Inter-City Buses	Jan. 7-11, 46
_____	Watson, R. A.	Bearing Developments Resulting from Restrictions of Materials	Sept. 15, 45
_____	Willett, H. L., Jr.	The "For Hire" Carrier Looks at Depreciation	Jan. 7-11, 46
_____	Wilson, D. K.	Approaches to Vehicle Retirement	Jan. 7-11, 46
_____	Zeder, J. C.	More Power to Engineering	Sept. 10, 45

Papers Previously Announced

Vehicles

_____	Austen, Robert N.	Maintenance Engineering of Chassis Leaf Springs	May 9, 45
_____	Bentz, E. J. H.	Diesel Cold Starting Problems	June 11, 45
_____	Burke, John D.	The Practical Postwar Car — Report of Automobile Body Survey Conducted by the San Francisco Examiner	Jan. 8-12, 45
_____	Burkhalter, R. R.	Truck and Bus Transmissions	Oct. 10, 44
_____	Colby, Col. J. M.	Contribution of Industry to Ordnance Tank-Automotive Engineering	Jan. 8-12, 45
_____	Collins, Tom. J.	Post-War Diesel Engines	Feb. 12, 45
_____	Colwell, A. T.	Alcohol-Water Injection	Jan. 8-12, 45
_____	Colwell, A. T.	Fuel Requirements for Farm Tractors	Sept. 13, 44
_____	Davis, Francis W.	Power Steering for Automotive Vehicles	Jan. 8-12, 45
_____	Fageol, L. J.	Possibilities and Limitations of Post War Bus Design for City Transportation	Dec. 14, 44
_____	Fageol, F. R.	Advantages of Multi-Power Plants in Motor Buses	Jan. 8-12, 45
_____	Gohn, E. P.	Post War Truck Selection and Conditioning	Feb. 12, 45
_____	Gohn, E. P.	Cold Starting and Fleet Operation	Jan. 8-12, 45
_____	Hebert, Gordon	The Practical Postwar Car — Report of Automobile Body Survey	Jan. 8-12, 45
_____	Herold, Richard	Supercharged Two-Stroke Cycle Diesels	Nov. 9, 44
_____	Kettering, C. F.	Fuels and Engines for Higher Power and Greater Efficiency	Jan. 8-12, 45
_____	Kishline, F. F.	Probable Post-War Automobile Design Trends	Dec. 1, 44
_____	Lautzenhiser, F. B.	A Non-Technical Discussion of Diesel vs. Gasoline Power Plants in Motor Trucks	Jan. 8, 45
_____	Loweke, E. F.	Power Brake Valves	Nov. 1, 45
_____	Oetzel, J. G.	Post War Brakes	May 10, 45
_____	Park, Bryan	Over the Road Diesel Operation	May 15, 45
_____	Peirce, T. H.	Bonded Rubber Torsional Vibration Dampers for Diesel Engines	Jan. 8-12, 45
_____	Pierce, Bert	The Practical Postwar Car	Jan. 8-12, 45
_____	Rendel, T. B.	Post War Internal Combustion Engines and Their Fuels	Dec. 14, 44
_____	Slemmons, C. O.	Rubber Tracks for Agriculture	Sept. 13, 45
_____	Taylor, C. Fayette	Effect of Engine Exhaust Pressure on the Performance of Compressor Turbine Units	Oct. 4, 45
_____	Twyman, L. R.	Hydraulics as Applied to Tractors and Farm Machinery	Sept. 13, 45
_____	Vincent, E. T.	Piston Development Review	Jan. 8-12, 45
_____	Wilson, H. D.	Report of Automobile Body Survey conducted by the Chicago Herald American	Jan. 8-12, 45

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_____	Bachle, C. F.	Some Possibilities of Turbine Compounding with the Piston Engine	Jan. 8-12, 45
_____	Beal, G. F.	Making the Cockpit Practical	Jan. 8-12, 45
_____	Beard, M. G.	Future Operational Requirements in Relation to Cockpit Design	Oct. 5-7, 44
_____	Bergen, Com. J. J.	Some Observations on the Financing of Local Air Transport	Jan. 8-12, 45
_____	Berry, B. M. Rollins, F. S.	Aviation Lubricating Oils	Aug. 24, 45
_____	Brown, Merle Hoffman, Luther Griffin, J. R. Jr.	Cockpit Lighting	Nov. 17, 44
_____	Campbell, Kenneth	Some Advantages and Limitations of Centrifugal and Axia Aircraft Compressors	May 7, 45
_____	Campbell, Kenneth	Engine Cooling Fan Theory and Practice	April 5-7, 44
_____	Christenson, C. M.	A Report on the Nature of Ice Formation on Aircraft as Related to Airline Operations	Nov. 1, 45
_____	Colin, Lt. R. J., Jr.	Electronic Controls in Aircraft	Jan. 8-12, 45
_____	Costa, Philip J.	Detonation in Flight — Its Effect on Fuel Consumption and Engine Life	Jan. 8-12, 45
_____	Cunningham, J. W.	High Conductivity Cooling Fins for Aircraft Engines	May 1, 45
_____	Dietrich, F. J.	Aircraft Riveting and Equipment	May 1, 45
_____	Dolza, John	Coordination of Fluid Coupling Driven Auxiliary Supercharger Speed to Engine Manifold Pressure	Jan. 8-12, 45
_____	Doman, Carl T.	General Requirements for Helicopter Engines	Nov. 1, 45
_____	Eaton, D. C.	Cruising Economy By Use of Water Injection	Nov. 1, 45
_____	Edwards, M. L.	Performance of the Air Oil Separator in Engine Breather Systems	April 24, 45

Aeronautics Continued

Check Here	Author	Title of Preprint of Paper	Date of Presentation
_____	Etchells, E. B. Underwood, A. F.	Silver Bearings	May 7, 45
_____	Field, Howard	Reduction of Vulnerability of Aircraft Hydraulic Systems	April 19, 45
_____	Foster, J. N.	Application of High Production Methods to Reduced Production	Oct. 5-7, 44
_____	Fraas, Arthur P.	Flow Characteristics of Induction Systems	Jan. 8-12, 45
_____	Friedlander, J. W.	Operating Costs of Personal Airplanes	May 7, 45
_____	Gordon, Kenneth	Control Cabin Development	Jan. 8-12, 45
_____	Gregg, David	Cabin Superchargers	Oct. 5-7, 44
_____	Hanley, W. V. Hundere, A.	Economics of Airline Fuel Utilization	Nov. 1, 45
_____	Herrmann, K. L.	New Light Weight Power Plants for Post War Airplanes	Nov. 9, 44
_____	Hicks, R. D.	Service Experience with Light Aircraft Engines	May 7, 45
_____	Jones, Alun R.	Airplane Icing Problem and its Alleviation through Research	Nov. 1, 45
_____	Kelley, Bartram	Helicopter Stability with Young's Lifting Rotor	March 19, 45
_____	Kelly, R. D.	A Means of Warning of Incipient Breakdown of Smooth Air Flow of Airfoil Surfaces	Oct. 5-7, 44
_____	Kendrick, J. B.	Applied Aero-Economics	Jan. 8-12, 45
_____	King, W. J.	Axial versus Centrifugal Superchargers for Aircraft Engines	May 7, 45
_____	Knight, William	Stresses in Disc Wheels	April 5-7, 44
_____	Knight, J. E. Baxley, C. H.	Modern Aircraft Refueling	Oct. 4, 45
_____	Landgraf, F.	Helicopter Design Problems	Nov. 1, 45
_____	Lingle, Col. D. G. Seitz, Capt. G. A.	Army-Navy Aeronautical Standardization	Reprinted – Nov. 42 SAE Journal
_____	Loudenslager, O. W.	Structural Model Testing	May 1, 45
_____	Lusk, Capt. R. J.	Protection of Electrical Systems on Military Aircraft	April 24, 45
_____	McFarland, F. R.	Aircraft Engine Gears	May 7, 45
_____	MacNeil, C. S.	Propellers and Air Transport	Nov. 17, 44
_____	Maloy, Raymond B.	A Resume of Desirable Characteristics for Non-Stalling, Non-Spinning Airplanes	May 7, 45
_____	Mentzer, W. C. Mitchell, E. C.	Cargo Tiedown and Stowage	Dec. 4-8, 44
_____	Moreton, D. H.	Problems Involved in Airframe Lubrication	Aug. 24, 45
_____	Mullen, H. A. Boelter, L.	Aircraft Spotwelding at Willow Run	May 1, 45
_____	Nutt, Arthur	The Future of Standardization in the Aeronautical Industry	Jan. 8-12, 45
_____	Parks, M. J.	Cargo Airplane Accessories	Dec. 4-8, 44
_____	Parvin, D. R.	What About the Age of Flight? Air Transportation in the 5 years to follow the war.	Jan. 5, 45
_____	Prewitt, R. H.	Basic Factors of Helicopter Design	Jan. 8-12, 45
_____	Rawdon, Herb	Wood Versus Metal Aircraft Construction	Oct. 28, 44
_____	Rawdon, Herb	Requirements of the Feeder Line Airplane	Dec. 4-8, 44
_____	Reichel, W. A.	War Lessons in Testing of Accessories and Instruments	Oct. 5-7, 44
_____	Richards, W. M. S.	The Prediction of Engine Cooling Requirements by a Graphical Method	Oct. 5-7, 44
_____	Robinson, Ray	The Postwar Market for Personal Planes	May 7, 45
_____	Rodriguez, D. L.	Wartime Aircraft Service Problems — Their Solution	June 19, 45
_____	Rowe, M. R. Ladd, G. T.	Water Injection for Aircraft Engines	Aug. 24, 45
_____	Rudd, J. K. Heath, Westcott	Radio Interference and the Aircraft Engine	Oct. 5-7, 44
_____	Schweitzer, P. H. Sharples, L. P.	S-S System of Lubrication for Aircraft Engines	Oct. 4, 45
_____	Sheets, J. H. MacKinney, G. W.	Reverse Thrust Propellers for Use as Landing Brakes for Large Aircraft	Oct. 5-7, 44
_____	Shue, G. S.	Compressibility	Sept. 19, 44
_____	Smith, Robert L.	Potentialities of Air Cargo as a Merchandising Aid	Jan. 11, 45
_____	Stafford, Paul H.	Trends in Airport Runway Design	Jan. 8-12, 45
_____	Streett, John W.	The Detection of Detonation and other Operating Abnormalities in Aircraft Engines by Means of Special Instrumentation	Jan. 8-12, 45
_____	Wachs, Miller A.	Building Utility into the Helicopter	Feb. 7, 45
_____	Warner, Edward	International Airworthiness Standards	Jan. 8-12, 45
_____	Weeks, W. L.	Factors in Aeration and Deaeration of Aircraft Engine Oil	Oct. 4, 45
_____	Wendell, E. E. Warden, H. H. Kerr, H. H. Williams, G. L.	Weight Reduction of Aircraft Braking System thru the Use of Reverse Thrust Propellers	Oct. 4, 45
_____	Miller, A. B.	Primary Balancing of Radial Engines	Jan. 8-12, 45
_____	Wolfe, Thomas	Shipping by Air	Dec. 4-8, 44
_____	Wood Carlos Crosbere, A, B,	A Proposal for the Establishment of Commercial Air Cargo Service	Dec. 4-8, 44

Fuels and Lubricants

Check Here	Author	Title of Preprint of Paper	Date of Presentation
_____	Adams, E. W.	Performance Testing of Wheel-Bearing Lubricants	Nov. 6-7, 45
_____	Ambrose, H. A. Trautman, C. E.	Engine Oil Foaming	Jan. 8-12, 45
_____	Becker, C. F.	Gasolines — Past, Present, Future	Dec. 1, 44
_____	Berry, B. M. Rollins, F. S.	Aviation Lubricating Oils	Aug. 24, 45
_____	Brabbs, Lt. A. D.	Testing Heavy-Duty Lubricating Oils for Naval Service	Nov. 9-10, 44
_____	Brandes, Dr. O. L. Donaldson, H. H. Jr.	Use and Evaluation of Heavy Duty Engine Oils	May 9, 45
_____	Cattaneo, A. G. Bollo, F. G. Stanly, A. L.	A Petroleum Research Engineer's Outlook on Fuels for Conventionally Powered and Gas Turbine Aircraft	Aug. 24, 45
_____	Effmann, Karl H.	Engine Oil Consumption Determination	March 8, 45
_____	Galindo, Lt. Com. H. L.	Navy Experience With Diesel Fuels and Lubricants	May 17, 45
_____	Georgi, Carl W.	Detergency or Dispersancy in Heavy Duty Engine Oils	Nov. 9-10, 44
_____	Griep, Com. E. F. Goddin, Lt. Com. C. S.	Significance of Cetane Number in Fuels	Nov. 6-7, 45
_____	Holaday, W. M. Mount, W. S.	Discussing the Fuels and Lubricants Supply Problem	May 15, 45
_____	Kauppi, T. A. Pedersen, W. W.	Silicones as Lubricants	Nov. 6-7, 45
_____	Keyser, Paul V.	Progress Report on Gear Oils Projects-CRC	Jan. 8-12, 45
_____	Larson, C. M.	Diesel Fuel Additives Create New Concepts	Nov. 6-7, 45
_____	Penfold, Norman C.	Some Comments on Engine Testing of Heavy-Duty Oils	Nov. 9-10, 44
_____	Pigott, R. J. S.	Considerations Affecting Fuels and Lubricants from the War Work	Jan. 18, 45
_____	Ronan, J. T.	Motor Oil Performance	Dec. 11, 44
_____	Savard, A. J.	Fuel Vapor Recovery	Feb. 20, 45
_____	Tongberg, C. O. Ellis, R. E. Baxley, C. H.	Application of Heavy Duty Additives to Aviation Oils	Nov. 6-7, 45
_____	Wright, W. A.	A Survey of Past and Present Trends in Lubricating Oil Additives	Nov. 9-10, 44

Miscellaneous

Check Here	Author	Title of Preprint of Paper	Date of Presentation
_____	Aufmuth, R. B.	The Practice of Powder Metallurgy	March 12, 45
_____	Erwin, Wesley S.	The Sonigage, A Supersonic Contact Instrument for Thickness Measurement	Oct. 5-7, 44
_____	Frye, Col. J. H.	Metallurgy of Foreign Automotive Materiel	Jan. 8-12, 45
_____	Jackson, P. B.	Aluminum After the War	March 14, 45
_____	Osborn, H. B. Jr.	Tocco Hardening	Jan. 8-12, 45
_____	Painter, Richard Huber, Paul	Technique for Practical High Speed Motion Pictures	Jan. 8-12, 45
_____	McBrearty, J. F.	Utilization of New High Strength Aluminum Alloys	Oct. 4, 45
_____	Miller, Roy A. Tatman, Max E.	Shop Aspects of the New High Strength Aluminum Alloys	Oct. 4, 45
_____	Porter, F. P.	Methods for Calculating Torsional Vibration	Jan. 8-12, 45
_____	Sanders, Morris	Wartime Fabric Developments of Significance to the Automotive Industry	Jan. 8-12, 45
_____	Somes, Howard E.	Induction Head Treatment of Internal Surfaces as Applied to Automotive Industries	Jan. 8-12, 45
_____	Strothman, E. P.	Some Cases for Steel as a Material	Jan. 8-12, 45
_____	Riesing, E. F.	Synthetic Rubber Mechanical Parts in Present and Post-war Vehicles	Jan. 8-12, 45
_____	Vaughn, F. F.	Induction Hardening as Applied to Farm Machinery	Sept. 13, 45

Limited supply of older SAE Meetings Papers in mimeographed form is also available. A permanent file of SAE Meetings Papers is kept in the SAE Library, from which photostatic copies can be made, upon request, at cost.

SAE VETERANS AVAILABLE

Following are briefed experience records of SAE veterans of World War II who are seeking employment through the SAE Placement Service. Interested employers are invited to address inquiries by number to SAE Placement Service, Society of Automotive Engineers, 29 West 39 St., New York 18, N. Y.

4872 Project Engineer, 25, experience as engineer in chg. of setting up prod. of sub-assemblies for radar units; and as layout draftsman and checker. Veteran, grad. engineer. Resident – N. J., prefers Met. N. Y. location, otherwise open.

4902 Grad. of Aero. Engrg. School, 24, desires a job with an aircraft factory in Met. N. Y. area. 2 yrs. stress analyst on helicopters, 2 yrs. USAAF helicopter specialist. Resident – N.Y.C.

5037 Automotive Engineer, 52, honorably discharged U. S. AAF Jan. 1, 1945, after serving overseas as Major and Lt. Colonel, experience in research, lubrication, as mgr. of sales petroleum co., super-service stations; can handle fleet operation, take complete charge of shops and can handle men. Available immediately. Resident – Chicago, location open.

5039 Prod. Engr., 37, experienced in aircraft engine maint., working for Army Air Depot, discharged soldier World War II, 10 points preference with Civil Service Comm., foreign languages French and German, available now. Resident – Utah, location preferred – East or Europe.

5096 Transp. Engr. and Supt. of Automotive Maint., 56, experienced heavy duty equipment both diesel and gasoline powered, has had wide experience in field inspections, also setting up and teaching in automotive schools. Speaks French and German. Will consider foreign service, Army service. Has had charge of large shops, maint. of all types of motor cars and trucks for manufacturer, dealer and fleet owner. Resident – N.Y.C., available immediately.

5099 Mechanical Engineer, 27, experienced in aircraft engine and spark plug testing and general aircraft inspection. Now in Army, desires maint. engrg. position with an airline. Will accept U. S. or foreign location. Resident – Pa.

5102 Young Grad. Aero. Engr., 26, with 3 yrs. experience, desires engrg. position involving coordination of design, tooling and prod. depts. Discharged veteran AAF. Willing to undertake advanced schooling in preparation for possible future executive position in organization. Has completed one yr. grad. work in business adm. Resident – Ohio, prefers New England or Mid-west location.

5127 Fleet Operation, Maint. and Service Supt., 48, wide experience in truck transportation, also heavy equipment such as road equipment and cranes. Recently discharged U.S. Navy "Seabees" after 2 yrs. in South Pacific Islands. Resident – Calif., location open.

5132 Grad. Aero. Engr., 30, experience in aircraft engine installation, prod. engine testing, engine experimental engrg. and wind tunnel testing. Desires position in prod. engrg. with opportunities in prod. management. Resident – Penn., location open.

5133 Aero. Engr., 45, married, dependent, lawyer, admitted legal practice 12 yrs., grad. Naval Engineer, 8 yrs. experience mostly aeronautical; BS., LLb. Naval Eng. JSDr.; supervisory experience in research, design, electric, physical and hydraulic testing, magnetos, highly precision equipments. Quality control organizer. Desires position with airline and/or where legal and engrg. knowledge and experience both useful. Released USAAF Sept. 30, 1945, also served in World War I as test pilot (flying boats). Resident – N.Y.C., prefers N.Y. or foreign location.

5134 Aero. Engineer, 31, 8½ yrs. experience in airline, aircraft engine co., aircraft co. and Army Air Forces, desires permanent connection in aeronautical industry or engrg. sales. Resident – Calif., location open, foreign considered.

5157 Service Mgr. or Sales Service Engr., 39, 12 yrs. experience for mfgr. of industrial engines (gas diesel) automobiles, trucks, marine engines, tractors, road building equipment or allied automotive equipment. Resident – Detroit, prefers Midwest location.

5165 Naval Officer, 40, ME and MME degrees, available soon, 20 yrs. experience gasoline and diesel engine development, research, motor coach fleet operation, executive ability, lab. direction. Resident – L.I., prefers L.I. or Met. N.Y. location.

5174 Grad. Mech. Engr., 23, honorable discharge U.S.A., 16 mos. experience designing precision instruments, electro-mechanical devices. Capable of assuming responsibility. Resident – N.Y.C., prefers N.Y.C. location or vicinity.

5186 Navy Test Pilot, 29, 8 yrs. aero. design and flying experience, ME degree. Desires sales engrg., contact, dev. or test work. Will travel anywhere. Available immediately. Resident – Penn.

5188 Supt., Fleet Operations and Maint., 28, 5 yrs. experience Army Operations and Maint. Officer (475 vehicles), gasoline and diesel equipment. BS in ME. Resident – Montana, prefers West or Northwest location. Available Jan. 1, 1946.

5205 Sales or Service Promotion, grad. ME, 42, recently Captain Marines, desires connection with car, truck or parts manu. or major oil co. 20 yrs. experience. Location open, available immediately, Resident – N.Y.

5216 M.E. Grad., M.I.T., 26, former Naval officer, experience toolmaker, has held CE and Prod. Mgr. positions in metal fabrication and assembly. Available immediately. Resident – N.Y., location open.

5217 Tool Process Engineer, 30, married, veteran Army Air Forces, physically fit, 10, yrs. wide practical experience tool and gage mfg. and inspection. Available immediately, temporary resident – Denver, Colo., prefers Detroit area.

5218 Industrial Engineer, General Foreman, Prod. Mgr. or Supt., 43, Army officer (Major), transferred to inactive duty, 20 yrs. experience in machine tool field, in handling and supervising personnel. Best of character. Available immediately. Resident – Va., location open.

5219 Production Engineer, 33, grad. EE, 7 yrs. experience supervising manu. prod. and inspection of automotive parts, 4 yrs. as project and liaison officer on tracklaying vehicles for Ordnance Dept. Resident – Mich., location open.

5220 Commercial Engineer, with Master's degree in Automotive Engrg., 30, 2 yrs. experience in automotive engrg., 4 yrs. as project officer, Capt. U. S. Army, on tank dev. Desires position as project or sales engineer in automotive or related field. Resident – Detroit, prefers Midwest or Southern location.

5242 Experimental Engineer, 34, 10 yrs. experience, now Major Ordnance Dept., desires supervisory position in automotive engine dev., sales engrg, or accessory fields. Available Jan. 1st. Resident – Detroit, prefers Conn. or Detroit location.

5255 Mech. Engr., 25, BS Iowa State, 2½ yrs. experience testing performance of B-29 airplane, maint. test crew flight engineer and experience with maint. and overhaul of aircraft engines and allied equipment. Desires work in internal combustion engine testing or design. Resident – Iowa, prefers Midwest location, otherwise open.

5256 Research & Dev. Engr., 24, married, 6 yrs. varied experience in designing and dev. of diesel engines and accessories. Experience includes gas turbines and superchargers. Capable and experienced in project planning and supervision. Desires position with progressive firm. Resident – N.Y.C., prefers Met. N. Y. location.

5262 Mech. Engr., 23, former Air Corps Engrg. officer, 3 yrs. experience in design, plant and aircraft maint., shop processes, field work. Desires machine design, prod. dev. or plant maint. position. Resident – N.Y.C., prefers Met. N. Y. or New England location.

5267 Grad. M.E., 23, veteran, on "Dean's List of Distinguished Students" for 4 yrs., speaks, reads, writes German fluently, 2 yrs. experience in assembly, repair, maint., operation of diesel and automotive equipment, desires research or experimental work. Resident – L.I., prefers eastern location.

L. C. Goad, vice-president of General Motors Corp., has been appointed a group executive in charge of the GM divisions at Dayton, Ohio; Rochester, N. Y.; Linden, N. J.; and Southgate, Calif; and also of contemplated plants at Atlanta, Ga.; Framingham, Mass.; Kansas City, Mo.; and Wilmington, Del. Mr. Goad, a member of the administration Committee of GM, joined the corporation in 1923

About S

WILLIAM J. SCHLAPMAN has been appointed advertising and sales promotion manager of the Young Radiator Co., Racine, Wis. He has been associated with the company a number of years as sales engineer in the contract department. Prior to coming to Racine, Mr. Schlapman was in direct selling work in Milwaukee.

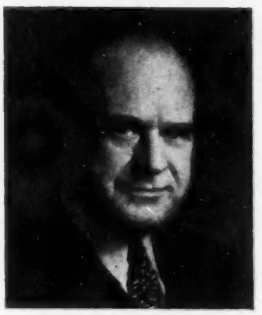
WILSON H. MORIARTY has been elected vice-president in charge of sales for the National Malleable & Steel Castings Co. Prior to his election as vice-president, Mr. Moriarty was assistant to the president of the National organization. Mr. Moriarty joined National shortly after serving as an officer in the U. S. Army in World War I. He became a resident inspector at the Cleveland plant and later held similar positions in the East St. Louis and Chicago plants. In 1927 he was appointed chief inspector for all of the company's plants, and in June, 1942, he became assistant to the first vice-president.

R. O. SLATTERY, until recently a major in the Ordnance Department, has returned to civilian life and has taken up his former work as a lubrication engineer in the St. Louis office of the Shell Oil Co., Inc. During his military service, Major Slattery was in the Fuels and Lubricants Division of the Ordnance Department.

COL. C. L. CHRISTENSEN, U. S. Army, has recently left Antwerp, Belgium, after serving forty-one months overseas in England, North Africa, and France. He recently arrived in the States and has made his residence at Olivebridge, N. Y. Before entering the service, Colonel Christensen was associated with the Tide Water Associated Oil Co.

ARTHUR C. JENKINS has become a consulting engineer and general manager of Gray Lines, Inc., and Yosemite Gray Lines, Inc., San Francisco. He was formerly a commander, U. S. Navy, San Francisco.

GEORGE H. KUBLIN has rejoined General Motors Overseas Operations as chief engineer of Product Engineering, Detroit office. Mr. Kublin, formerly assistant chief engineer of the Overseas organization, has served during the war as chief engineer for the Fisher Tank Division of General Motors.



George H. Kublin

Formerly stationed aboard the U. S. S. Frankford, c/o Fleet Post Office, San Francisco, **ENS. JAMES R. SAUSSER, JR.,** may now be reached at the Material Redistribution & Disposal Office, Detroit.

LAWRENCE S. LeGROS has joined General Motors Overseas Operations, Division of General Motors Corp., New York City, as sales engineer. He had been an engineer in the Experimental Division of the Detroit Diesel Engine Division of General Motors, Detroit.

EMIL F. GIBIAN has been appointed to the position of chief industrial engineer for Cleveland operating divisions of Thompson Products, Inc., and Thompson Aircraft Products Co. In his new position he will direct operating controls such as standards, plant layout, and methods improvement and simplification. Mr. Gibian brings to his new post wide experience in the automotive field, embracing the supervision of tool designing, quality control, standards, and plant and mechanical maintenance. Joining Thompson Products in 1933 as a mechanical engineer, Mr. Gibian served as chief engineer at Tapco throughout the war, and more recently as factory manager and chief engineer of the company's Jet Propulsion Division.

WILLIAM D. HAZLETT, until recently section engineer in charge of drafting and standards, Aeroproducts Division, General Motors Corp., Dayton, Ohio, has been appointed executive engineer of the company. He has been an active member of several SAE technical committees.

Formerly model test engineer, Dodge Chicago Plant, Division of the Chrysler Corp., Chicago, **HENRY H. HERING, JR.,** is now associated with the General Electric X-Ray Corp., same city, in the position of mechanical design engineer.

ROBERT V. KERLEY has been named director of aeronautical research of the Ethyl Corp., Research Laboratories, Detroit. He was mechanical engineer with the USAAF, Air Technical Service Command, Wright Field, Dayton.

ARTHUR W. HARRIS, General Motors Corp., has been transferred from the Chevrolet Aviation Engine Division, Buffalo, N. Y., where he was assistant chief engineer, to Chevrolet Motor Division, Detroit, where he is engine production engineer.

Formerly chief engineer with the Atlantic Diesel Corp., New Brunswick, N. J., **WINTHROP A. JOHNS** is now a vice-president of Vibradamp, Inc., same city.

New Timken Appointments

Ray L. Morrison (left) has been appointed head of the new Brake Division of the Timken-Detroit Axle Co. Mr. Morrison was previously vice-president and general manager of the Bendix-Westinghouse Automotive Air Brake Co. Ralph K. Super (right), who for the past six years has been brake engineer for Timken Axle, will serve with the newly formed unit in the capacity of brake division engineer

SAE Members

RICHARD H. DEPEW, JR., is now chief of the aircraft disposal section of the Aircraft Division, Reconstruction Finance Corp., Office of Surplus Property, Washington, D. C. He was previously manager of special projects, Fairchild Aircraft, Division of Fairchild Engine & Airplane Corp., Hagerstown, Md.

F. RANKIN WEISGERBER has been elected executive vice-president and director of Lister-Blackstone, Inc., Milwaukee, Wis. He was formerly eastern sales manager of Woodall Industries, Inc., Detroit.

F. Rankin Weisgerber

Formerly experimental test engineer, Wright Aeronautical Corp., Paterson, N. J., **KENNETH R. PIKE** is now associated with the West Bend Aluminum Co., Hartford, Wis.

Recently resigned from his post of field engineer with the U. S. Rubber Co., Detroit, **E. B. MUNSON** is now associated with Montgomery Ward & Co., in the Automobile Tire Department.

CAPT. EDWARD V. (EDDIE) RICKENBACKER was recently re-elected president of Eastern Air Lines, Inc., for a 10-year period. He became general manager of the company in 1934, and was elected to its presidency in 1938. A veteran in the automotive industry, he had been president of the Indianapolis Speedway until recently. He was elected a member of the Society in 1928.

FRANK T. CHRISTIAN has been appointed chief engineer of the Eclipse Machine Division of Bendix Aviation Corp. Since 1940 he has directed engineering for the corporation's commercial production of Bendix starter drives and bicycle coaster brakes. A graduate of Bucknell University, Mr. Christian has been associated with the Eclipse engineering staff since 1929.

Formerly service engineer with the Lycoming Division of the Aviation Corp., Williamsport, Pa., **JOSEPH H. JEAVONS** is now the owner of J. H. Jeavons & Sons Marine Service, Vermilion, Ohio. The firm will operate as a boat and engine service yard.

ALBERT W. LAVERS has been appointed chief engineer, Agricultural Equipment Division, Graham-Paige Motors Corp., Willow Run, Mich. Until recently he was chief engineer, tractors, of H. Ferguson, Inc., Dearborn. Mr. Lavers is chairman of the SAE Tractor War Emergency Committee. Since 1934 he has been a member of the SAE Gasoline Engine Division, of which group he also served as chairman, and he has been active on numerous SAE technical committees since he was elected to membership in 1924. During the war he served the Government as a member of the War Production Board's Farm Machinery and Equipment Division in a consulting capacity.

G. HERBERT MILLER has been appointed general manager of N. R. Miller & Co. of Toronto, Ont., Canada. The Miller organization specializes in the manufacture of textile fabrics for upholstery.

BURTON J. LEMON, who was in charge of the rubber branch at the Office of the Chief of Ordnance, Detroit, has been awarded the Legion of Merit for outstanding contributions to the development of synthetic tires for military use. He was promoted to the rank of colonel simultaneously with the presentation of the award. Colonel Lemon, who recently returned to inactive status, has rejoined the Commercial Development Department of the U. S. Rubber Co., New York City.

Formerly representative for the industrial production department of the Sun Oil Co., Detroit, **F. A. PENCE** is now northwest representative for the same firm. Mr. Pence has made his headquarters in Minneapolis, Minn.

HARRY P. DOBROW, formerly a civilian automotive engineer and technical consultant in the U. S. Army Service Forces, Office of the Chief of Ordnance-Detroit, has joined Willys-Overland Motors, Inc., where he will be engaged on special assignments under the direction of **D. G. ROOS,** vice-president in charge of engineering, and **W. F. BENNING,** chief engineer of the chassis division. Mr. Dobrow brings with him to Willys a broad background of experience in air conditioning and refrigeration, and aircraft and automotive powerplants.

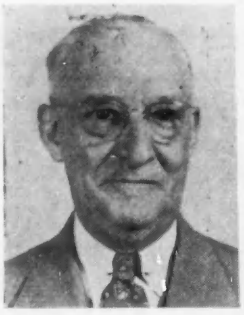
Lt.-Gen. James H. Doolittle

LT.-GEN. JAMES H. DOOLITTLE will return to the Shell Union Oil Corp. as a vice-president and will be nominated as a director at the next stockholders' meeting. In addition to general corporate duties, General Doolittle, former commander of the Eighth Air Force, will also be responsible for the coordination of the aviation interests of the Shell companies in the United States and for assistance in the world-wide aviation activities of the Shell group. General Doolittle's headquarters will be in New York City.

After serving 26 years with the Ordnance Department, **HARRY A. KNOX** has retired and will make his residence in Washington, D. C. From 1922 to 1942, Mr. Knox held a lieutenant colonel's commission in the Ordnance Reserve Corps. During 1918 he was appointed a major in active service as chief of the Tractor Section, Office of the Chief of Ordnance, Washington, D. C., and since that time has been with the department as head automotive engineer. Mr. Knox has designed fighting tanks and track-laying vehicles and has taken out many patents on the transmissions, suspensions, tracks, and controls now used on these

Harry A. Knox

tanks and vehicles. Shortly after he graduated from the Springfield Technical Institute in 1894, he designed and built a 4-cyl automobile engine there, and later made a contract with the Overman Bicycle Co., Mass., to design a gasoline automobile



Edward B. Reeser

M. J. Brennan

Edward B. Reeser has retired from the Willard Storage Battery Co. of Detroit and will be succeeded as Central Division manager by M. J. Brennan, formerly Western Division manager of the company. Mr. Brennan will take over the accounts in the Detroit area which Mr. Reeser formerly handled. Mr. Reeser, who has served with the Willard firm for more than thirty years, had been Central Division manager since 1924. A farewell dinner was held in his honor on Nov. 30

equipped with this engine. A founder member of the Society, Mr. Knox was elected a life member in 1940.

GUNNAR PALMGREN, chief engineer, SKF Industries, Inc., Philadelphia, has, with Bryce Ruley, translated "Ball and Roller Bearing Engineering," by Arvid Palmgren, from Swedish to English. The translation is available from SKF Industries, Inc., Philadelphia.

BRIG.-GEN. JOHN K. CHRISTMAS, deputy commanding general, U. S. Army, Office of the Chief of Ordnance, Washington, D. C., has been awarded the Distinguished Service Medal in recognition of his "outstanding service in a duty of great responsibility" rendered while he was serving in various posts during the war.

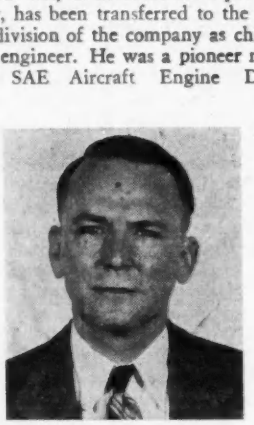
E. W. HEDEEN, JR., a seaman first class in the USNR, is serving at the USN Main Garage at Great Lakes, Ill.

EDMUND B. NEIL, research professor of the Ohio State University Research Foundation, has established a consulting engineering office at 547 East Broad Street, Columbus, Ohio, specializing in re-design for production. During the war he wrote a number of manuals and bulletins on new products and processes.

CHARLES W. BOHMER, JR., has been appointed assistant manager of the sales engineering department of the Standard Oil Co. of N. J. Shortly after his graduation from the University of Pennsylvania, Mr. Bohmer joined the Standard Oil Co. in 1930 as a student engineer. In 1931 he was assigned to the Standard Oil Development Corp. and several years later he joined the sales engineering department where he specialized in lubrication and fuel problems.

Charles W. Bohmer

R. S. KELLOGG, who was formerly with the airplane engine division, Packard Motor Car Co., as assistant chief production engineer, has been transferred to the marine engine division of the company as chief production engineer. He was a pioneer member of the SAE Aircraft Engine Drafting



R. S. Kellogg

Practice Committee and the SAE is indebted to him for the active part he has played in developing the SAE Drafting Manual. His colleagues on the committee regret that he has resigned because of his new duties.

R. J. BENDER has recently returned to Sinclair Refining Co., New York City, as assistant to the chief consulting engineer. Mr. Bender has been released to inactive duty after serving two and one-half years in the Navy where, for a year, he served as technical liaison officer with Petroleum Section AFHQ, in the Mediterranean area. Later, with the U. S. Naval Technical Mission in Europe, he was part of the group of technicians who entered Germany to obtain first-hand information on scientific achievements of the Germans, especially in the field of synthetics, diesel fuel, aviation gasoline and lubricants, and special processes of combustion and power production.

J. H. HENRY, owner of the Henry Dredging Co., Stockton, Calif., has reopened his company. The firm began dragline gold dredging in 1940. During the war years, Mr. Henry had been training officer, U. S. Navy, Naval Training School (Diesel), Cleveland.

Formerly a midshipman, stationed at the Midshipmen's School, Notre Dame, Ind., **ENS. DELBERT E. COLLINSON,** USNR, may now be reached at the Naval Air Station at Jacksonville, Fla.

COL. MARK V. BRUNSON, Quartermaster Corps, U. S. Army, recently returned from overseas, is now assigned as Quartermaster of the Second Service Command, Governors Island, N. Y. Colonel Brunson went overseas in November, 1942, and established and operated the truck fleet operating from the Persian Gulf to the Caspian. Later he was Theater Deputy Quartermaster in North Africa, Sicily, Sardinia, Corsica, Italy, and Southern and Eastern France. Most recently he commanded the Quartermaster Base Depot at Antwerp and later at Mannheim, Germany. Just prior to World War II, while on duty in the Office of the Quartermaster General, Colonel Brunson served as War Department representative on the SAE-QMC Advisory Committee which initiated action toward standardization of many unit assemblies, parts, and accessories for army motor vehicles.

K. L. HERRMANN is now the owner and an engineer of the Herrmann Engineering Co., Glendale, Calif. A cam engine research program, halted in 1941 because of the lack of priorities, will be continued by the company. Mr. Herrmann has just resumed his civilian activities after serving with the Bureau of Aeronautics for three and one-half years.

Recently returned from a technical mission to Germany, **OTTO E. KIRCHNER,** director of aircraft engineering, American Airlines, Inc., and **LOUIS H. ENOS,** assistant chief engineer, Curtiss Propeller Division, Curtiss-Wright Corp., discussed their observations and personal studies made during their visit at the Dec. 10 meeting of the New York Section of the Institute of the Aeronautical Sciences. **JEROME LEDERER,** chairman of the meeting, has recently been appointed aeronautical engineering consultant to the Aviation Section, New York Board of Trade. Mr. Lederer was formerly executive assistant for the Airlines War Training Institute, New York City.

Formerly machine and tool checker, Empire Designing Co., Inc., New York City, **ALBERT C. KELLY** has joined Huff Bros. Co., same city, where he is employed as a machine designer and checker.

SIDNEY OLDBERG has been appointed executive engineer, Wilcox-Rich Division of the Eaton Mfg. Co., Detroit. For ten years before joining Eaton, Mr. Oldberg was with the Chrysler Corp., recently in charge of aircraft engine research and development. **CARL VOORHIES,** research engineer, has been placed in charge of the division's new product development projects.

Sidney Oldberg

JOHN F. McGROGAN, who for the past three years has been associate automotive engineer in the research and development department of the Atlantic Refining Co., Philadelphia, has recently been transferred from work in the Automotive Laboratory to take charge of development and testing of lubricating greases for both automotive and industrial application. Mr. McGrogan is also assisting in the technical aspects of the company's sales promotion work.

B. F. KLEIN has become associated with Petroleum Advisers, Inc., New York City. Mr. Klein was formerly chief of the Petroleum Section, U. S. Army Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

Formerly in the service engineering department, Wright Aeronautical Corp., Paterson, N. J., **PVT. JOHN A. KIMBERLEY,** U. S. Army, is now in the USAAF and is a project engineer at the Propeller Laboratory, Wright Field, Dayton.

ERNEST ZUMSTEG, of General Motors Java, Batavia, arrived in New York, and is staying at the Essex House, Central Park South. Mr. and Mrs. Zumsteg were detained in Bandoeng, N. E. I., during the Japanese occupation.

C. LINCOLN CHRISTENSEN has returned from overseas and has been promoted to the rank of colonel after three and one-half years of service in England, Africa, and Europe. He received the Nichan-Iftikar from Tunisia, the Croix de Guerre with palm from France, and the Bronze Star from our own Army. He had been associated with the late **JOSEPH ANGLADA,** and was on the editorial staff of the Chilton Co. earlier in his engineering career. Col. Christensen shortly will return to civilian life.

C. WILLIAM VIETS has joined Wagner Wood Products, Dayton, Ohio, in an engineering capacity. He was formerly division engineer with Aeroproducts Division, General Motors Corp.

Formerly assistant foreman, test inspection department, Dodge Chicago Plant, division of the Chrysler Corp., **ROBERT N. WHITE** recently became an industrial engineer with the Shell Oil Co., Inc., Chicago.

PAUL WILLIAMS has been named works manager of the Spun Steel Corp., Canton, Ohio. He previously served as manager of the sub-contracting department of the Continental Aviation & Engineering Corp., Muskegon, Mich.

Formerly president of the Clyde Aircraft Mfg. Co., Ltd., Collingwood, Ont., Canada, **G. A. C. BEAR** is now general manager of the Ontario Automobile Co., Ltd., Toronto.

WILLIAM T. STEPHENS has been elected president and chief engineer of the Industrial Hydraulics Corp. of Cleveland. Mr. Stephens, was previously executive vice-president of the Hydraulic Control Engineering Co., and vice-president in charge of sales and engineering of the Hydraulic Equipment Co.

Formerly experimental test operator, Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn., **NORMAN F. JONES** is now plant maintenance mechanic with Geo. W. Moore, Inc., Waltham, Mass.

The automobile industry is exploring intensively the use of polarized light as a means of substantially eliminating the headlight glare, O. E. HUNT, chairman of the Engineering Liaison Committee of the Automobile Manufacturers Association, told the American Association of Motor Vehicle Administrators last month. "Right now," he stated, "polarized headlighting can only be regarded as a possibility. Whether it will materialize into a reality is a question we just can't answer until we have done a lot more work."

Commenting on other vehicle design elements of special interest to state vehicle administrators, Mr. Hunt, who is executive vice-president of General Motors Corp., brought out the following points:

Directional signals – operated by a switch on the steering column which causes parking and stop lights to flash intermittently – have been readily understood by motorists and enforcement officers. He urged, however, that such signals – now optional equipment on some cars and standard on others – not be made mandatory in any states until more is known about their overall contribution to safety.

Use of transparent plastic for motor vehicle glazing is being investigated by an SAE committee, whose recommendations will be transmitted to the Sectional Committee of the American Standards Association which drew up the code which state vehicle administrators use as a basis for approval of safety glass. Present indications are "that these transparent plastics offer attractive advantages in some motor vehicle applications, but do not currently appear suitable for windshield use."

License plate standardization throughout the various states would help engineers to provide better mountings.

The AMA Motor Truck Committee has under way a broad truck brake research program involving tests by all truck builders. Mr. Hunt's personal opinion is that the industry's responsibility is to provide each truck with brakes adequate to control the vehicle when loaded to the maximum authorized by the manufacturer; that the manufacturers can influence, but law enforcement officers must control, the maintenance of brakes in proper operating condition and the overloading of trucks.

At several points in his talk, Mr. Hunt referred to SAE technical committee work in glowing terms. "The industry regards the SAE as its technical arm," he said, "and refers to it many technical problems which can be handled best by cooperative action among engineers . . . A recent job the SAE has done, which has been helpful to both state vehicle administrators and the industry, is its work on driving equipment for disabled veterans . . . The SAE, through its War Engineering Board, did its usual good job."

LOUIS P. JOHNSON, formerly motor transport superintendent, USAAF, Spokane Army Air Depot, Spokane, Wash., has returned to the Colyear Motor Sales Co., Spokane, as a field service specialist.

WILLIAM M. DAVIS has opened offices in Colorado Springs, Colo., as a consulting engineer. Mr. Davis previously was associated with F. W. Derbyshire, Inc., Waltham, Mass., as chief engineer.

G. ELDON IRVING has been named chief engineer of the Vendorlator Mfg. Co., Fresno, Calif. Before joining the Vendorlator firm, he was plant superintendent, Hammond Aircraft Co., South San Francisco.

Previously senior test engineer with Wright Aeronautical Corp., Paterson, N. J., **OTIS E. HUNT** has joined the Woods Hole Oceanographic Institute, Woods Hole, Mass., as a research engineer.

MAJOR F. R. NAIL has been appointed assistant to the chief engineer in charge of highway truck developments of Mack Trucks, Inc. In his new capacity, he will share responsibility for engineering policies in the designing of highway trucks. Recently released from active duty, Major Nail returns to Mack after serving in Detroit where he was in command of the engineering branch of the Office of the

Major F. R. Nail

Chief of Ordnance. Major Nail joined Mack in 1934, following graduation from North Carolina State College, where he majored in mechanical engineering. At the start of the war he became a member of the Mack general engineering department in charge of all military motor vehicle equipment. Major Nail will make his headquarters in the Empire State Building, New York City.

BEN M. ANDERSON has returned as president of Anderson, Greenwood Aircraft Co. of Houston, Tex., manufacturers of personal aircraft. For the past four years Mr. Anderson has been associated with the engineering department of Boeing Aircraft Co., Seattle, Wash.

Formerly development engineer, Weatherhead Co., Cleveland, **HAROLD J. KNAGGS** has joined the Apex Electric Co., Sandusky, Ohio, as project engineer.

Formerly coordinator, job methods department, Republic Aviation Corp., Evansville, Ind., **CLYDE G. HAYNES** is now process engineer with the Victor Adding Machine Co., Chicago.

CLIFFORD V. WILLIAMS, Delco Products Division, General Motors Corp., has

Charles D. Hawley (left) has been appointed assistant to the general manager of the Research Laboratories of the Ethyl Corp. at Detroit, and John B. Taylor, Jr. (right), has been named to succeed him as assistant director of engineering research. Joining Ethyl in 1927 as an engineer in the Yonkers, N. Y., laboratories, Mr. Hawley became assistant director of engineering research when the laboratories moved to Detroit a year later. Mr. Taylor came to Ethyl 15 years ago as an engineer with the Baltimore division and since 1939 has been a member of the staff of the engineering research laboratories.

been transferred from Detroit to Dayton, Ohio.

HAROLD D. MOREHOUSE, formerly technical field engineer, Boots Aircraft Nut Corp., Detroit, has established an office in Detroit as a manufacturers' representative.

Previously design draftsman, Hall Scott Motor Car Co., Berkeley, Calif., **NORMAN B. HAWKER** has joined the Pacific Telephone & Telegraph Co. as plant engineer in the San Francisco Division.

C. HAROLD HELLING, General Motors Corp., has been transferred to the Foreign Distributors Division, New York City, as truck and bus sales engineer. He had been project engineer at the Detroit Diesel Engine Division of the same corporation.

OSWALDO FADIGAS FONTES TORRES has joined the Companhia Aeronautica Paulista, Sao Paulo, Brazil, as an aerodynamicist. He was formerly a student at M.I.T., Cambridge, Mass.

V. M. BLEGVAD has become connected with the Export Division of the Chrysler Corp. as service engineer for Sweden, Norway, and Denmark. He was previously test engineer with the Detroit Diesel Engine Division of General Motors Corp., Detroit.

BOYD A. CHRISTENSEN is now at the University of Oklahoma, Norman, Okla. He was formerly general foreman, tool design section, Wichita Division, Boeing Airplane Co., Wichita, Kans.

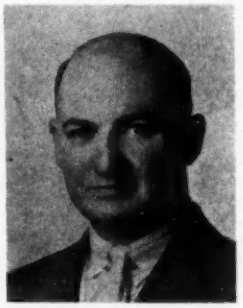
Formerly with the Jones-White Truck Co., Spokane, Wash., **WILLIAM B. KEITH** is now affiiliated with the Spokane Kenworth Co., Spokane, Wash. Mr. Keith is secretary of SAE Spokane Group.

JAMES B. MISNER has joined the Globe Aircraft Corp., Fort Worth, Tex., as a sales representative. Before coming to the Globe

James B. Misner

Organization, Mr. Misner was field service administrator, Consolidated Vultee Aircraft Corp., San Diego, Calif.

LEWIS HANKINS has joined Hemingway Bros. Interstate Trucking Co., as superintendent of equipment and as purchasing agent. Mr. Hankins, who, for the past 16 years, has been a consulting engineer with Gulf Oil Corp., Boston, Mass., will make his headquarters at New Bedford, Mass. Before affiliating with Gulf Oil, Mr. Hankins was connected with the Martin Transportation Corp., and the Public Service Co. of New Jersey.



Lewis Hankins

A new edition of "Engineering Alloys" by **NORMAN E. WOLDMAN,** Bendix Aviation Corp., and **ROGER J. METZLER,** Breeze Corporations, Inc., is now available from the American Society for Metals, Cleveland. In addition to revising and expanding the information already contained in the book, the authors include in the revision data on new alloys developed and marketed since the publication of the first edition in 1936. The book is composed of six sections; namely, an alphabetical listing of the alloys; data on the alloys such as names, properties, and uses; an alloy classification and uses index; a directory of manufacturers and their alloys; a key index to manufacturers; and data pertinent to the alloys discussed. Mr. Metzler assumed co-authorship of the second edition upon the death of Prof. Albert Dornblatt, co-author with Dr. Woldman of the first edition.

NATHAN W. HOLBROOK has recently been named president and general manager of the Tennessee Marine Co., Inc., Nashville, Tenn. He was formerly chief tool engineer with the Lombard Iron Works, Augusta, Ga.

Formerly a student member at the University of Notre Dame, Ind., **WALTER L. MURPHY** is now an ensign in the USNR.

Previously sales manager, automotive products, Yale & Towne Mfg. Co., Detroit, **SAMUEL F. ROLPH** is now affiliated with Connector Locks of America, Inc., Detroit.

FRANK H. FUNKE has been named general manager of the Donaldson Co. of Canada, Ltd., Chatham, Ont. He was formerly manager of the Detroit office of the Donaldson Co., Inc., St. Paul, Minn.

Formerly a student member at Purdue University, West Lafayette, Ind., **CARLTON D. CORDEN** has joined Consolidated Vultee Aircraft Corp., San Diego, Calif. Mr. Corden plans to return to Purdue in 1946 for graduate work.

W. C. HILDEBRAND, JR., has been named vice-president of the Anchor Oil Co., Houston, Tex. Prior to joining the Anchor firm, he was vice-president in charge of sales for the Maritime Oil Co. of Houston.

Until recently project engineer with Packard Motor Car Co., Detroit, **EDWIN F. STOREY** is now experimental chassis design supervisor, Hudson Motor Car Co., Detroit.

Formerly an automotive adviser, U. S. Army, San Francisco, **ROBERT H. GARNOT** is now the owner and manager of the Associated Engine Co., same city. The company specializes in the rebuilding of automotive and marine engines.

Previously hydraulic process engineer, Eastern Aircraft Division, General Motors Corp., **J. RUSSELL HEMEON** is now a hydraulic engineer with the Fisher Body Ternstedt Division of General Motors, Trenton, N. J.

FRANK H. MYERS, JR., who had been test engineer, Wright Aeronautical Corp., Cincinnati, Ohio, will in January, 1946, assume his position as instructor with Parks Air College, Inc., East St. Louis, Ill.

W. MULOCK BROWN has resigned as technical data liaison officer with the British Air Commission, Washington, D. C.,

W. Mulock Brown

Mr. Brown is at present residing in Washington.

turn to p. 50

The President's Report for 1945

continued from page 22

nical reports and other publications are being actively handled. Continued growth in this special service to members is expected during 1946.

The editorial pages of the *SAE Journal* were increased during 1945, particular attention being given to development of more satisfactory summaries of technical papers. In addition, an increased quota of full-length papers was used. With the removal of governmental paper limitations in the fall of 1945, the quality of *SAE Journal* paper was increased as soon as new paper supplies could be obtained. Beginning with the January 1946 issue, the overall page size was returned to prewar standards, making the appearance more attractive and the text more readable.

New cover drawings, each symbolic of some phase of the technical areas covered by SAE activities, improved the editorial attractiveness of the *SAE Journal* in 1945. The work of one of the world's leading industrial artists, this series of covers will be continued throughout 1946.

Also, specific plans were completed for possible expansion of publication facilities by making *SAE Journal* and SAE Transactions into two separate, full-scale publications. (This expansion was detailed by the Publication Committee a year ago and later was approved by the SAE Council pending recommendation from the Finance Committee that funds were available for consummation of the program).

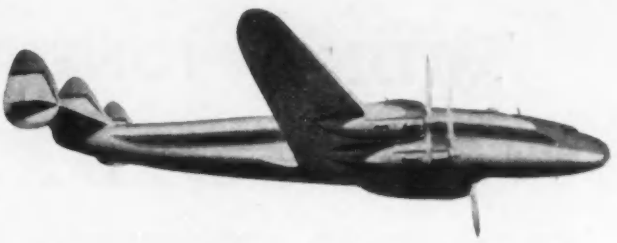
Faced with the greatest number of changes in history, procedures for producing the SAE Roster have been improved and realigned to make possible publication earlier rather than later in recent years. The 1946 Roster will be off the presses not later than April 1.

Sections Committee Gives Council New Advisory Aid

The Sections Committee – functioning under a new plan of operation approved by the Council – has, through its executive committee, cooperated closely with the Council as an advisory group on Section affairs.

Establishment of a definite "yardstick" to be used by Sections and Groups in considering affiliation with local technical organizations – and by Council in weighing such requests – was one of the most important recommendations proposed by the Sections Committee to receive Council approval. This set of rules was circulated to all Sections and Groups early in the year and has served as an effective guide ever since.

During the year the Sections Committee recommended and received Council approval on establishment of an SAE Section in Hawaii, transfer of the Peoria Group to full Section status, and recognition of a new Virginia Group. Council likewise approved the recommendation that the Southern Ohio Section be permitted to change its name back to "Dayton Section," because of the earlier creation of a Cincinnati Section.



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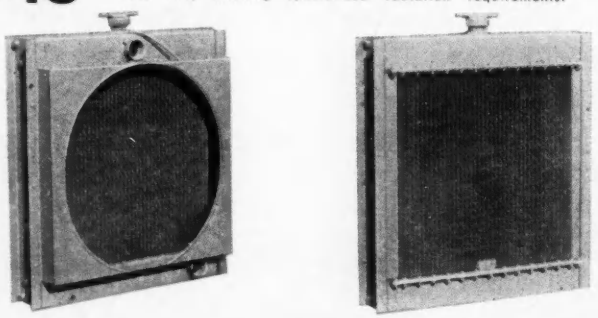
Today, Young "Mono-Weld" all steel radiators enjoy nation-wide use, meeting specialized radiation requirements.



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Postwar Fuels

cont. from p. 32

7. Danger to personnel maneuvering about on wing structure.

8. Loss from aeration and evaporation of fuel.

Far from presenting blueprints of a perfected method, Mr. Brandt said, the authors have tried to match the disadvantages of the present system with probable advantages of pressure refueling, and have found the latter great enough to merit extensive experimentation. They believe a good underwing refueling installation would offer:

1. Almost complete protection against fire through the use of a closed system.

2. Better delivery rate.

3. Possibility of loading passengers, cargo and fuel simultaneously.

4. Elimination of damage to wing structure.

5. Convenience and accessibility of filler opening location.

6. Simplification of procedure.

7. Elimination of danger to personnel.

Installation aspects demanding particular attention are weight, location of filler openings, type of connectors, method of control, maximum delivery rate desired, vapor accumulation removal, leakage or spillage, and trapped fuel. In spite of the potential advantages of underwing refueling, Mr. Brandt believes that the engineer called upon to design an efficient installation will be faced with a great many problems, since practical information based on experience is negligible. The best job will be done, he feels, by the engineer who is willing to discard outmoded notions of self-sufficiency and call on airframe manufacturers, customers, fuel manufacturers and numerous other scattered sources for information and advice.

About SAE MEMBERS

cont. from p. 48

FRANK S. JONES, who was research engineer with Black Industries, Cleveland, is now serving in a similar capacity with Trifari, Krussman & Fishel, Providence, R. I.

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Formerly a student member at Purdue University, West Lafayette, Ind., **ROBERT BRIEDE** is now a seaman first class in the USNR and is stationed at the Naval Training Center at Gulfport, Miss.

H. B. BARTLETT has been named manager of the Passenger Car Frame Division of the Parish Pressed Steel Co., Reading, Pa. He was formerly assistant to the vice-president, same company.

JOHN EKIZIAN, who had been a student member at CCNY, New York City, is now test engineer with Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn.

C. W. SHAW is now a consulting engineer with offices in Carriere, Miss. Mr.

Shaw, now specializing in the design and construction of farm equipment, was formerly executive engineer, Wilcox-Rich Division, Eaton Mfg. Co., Detroit.

A student member at the Case School of Applied Science, Cleveland, **SAUL RUBIN** is also employed as a research assistant at the school. He was formerly mechanical engineer, National Advisory Committee for Aeronautics, Aircraft Engine Research Laboratory, Cleveland.

WILLIAM H. McCOY, Packard Motor Car Co., has been transferred from the Detroit to the Toledo, Ohio, branch of the company.

PHIL S. ADAMS is now chief industrial engineer, General Petroleum Corp. of Calif., Los Angeles. He was formerly division manager, commercial sales department of the same company, Seattle, Wash.

CARL M. BERRY has been elected president of "Hi" Lewis Transportation, Inc., Kansas City, Mo. He was formerly manager of the "Hi" Lewis Oil Co., same city.

Formerly service manager, GMC Truck & Coach Division, General Motors Corp., Albany, N. Y., **EDWARD E. BERG** is now zone parts and service manager of the Buffalo, N. Y., branch of the same firm.

JOHN HARDMAN, Trans-Canada Air Lines, has been transferred from the repair base at Winnipeg, Man., Canada, to the new maintenance base at Moncton, N. B., where he is serving as aircraft inspector.

JAMES M. CONNELLY has been named chief research engineer of the New Plastics Corp., Hollywood, Calif. He was formerly research engineer, plastics, in the Los Angeles branch of the same company.

Formerly a student member at Case School of Applied Science, Cleveland, **LARRY H. KLINE** is now assistant project engineer, Ward Products Corp., same city.

EARL HATCH is now affiliated with the A. B. & C. Motor Transportation Co., Inc., Fitchburg, Mass.

Formerly director of research, Atwood Vacuum Machine Co., Rockford, Ill., **EARL L. SCHOFIELD** has organized his own firm, E. L. Schofield, Inc., same city.

Formerly a student member at California Institute of Technology, Pasadena, Calif., **FRANK M. DAY** is now an ensign in the USNR and is stationed at Fort Schuyler, New York City.

Formerly assistant supervising engineer, **WENDELL G. EVANS** has been promoted to the position of experimental equipment engineer, Lycoming Division, Aviation Corp., Williamsport, Pa.

Formerly at the Naval Training Station at Cornell University, Ithaca, N. Y., **ENS. SYLVAN E. CONNAIR** may now be reached at the Naval Air Station at Dallas, Tex.

JOHN E. DUBE, vice-president of the Alco Valve Co., St. Louis, Mo., has also been appointed general manager. He was formerly vice-president and director of engineering of the same company.

Formerly test equipment engineer, Wright Aeronautical Corp., Paterson, N. J., **ANDREW G. FARKAS** is now a seaman first class in the USNR, and is stationed at the Naval Training Center at Great Lakes.

E. J. TRUNK has recently become associated with the U. S. Rubber Co., Passaic, N. J. He was formerly service liaison engineer, Wright Aeronautical Corp., Paterson, N. J.

Formerly senior field engineer in the Seattle, Wash., branch of Wright Aeronautical Corp., **ROBERT N. JUNTWAIT** now holds the position of sales engineer in the Paterson, N. J., branch of the same company.

WESTON H. MYERS is now wholesale parts representative for the S. L. Savidge Co., Seattle, Wash. He was formerly parts manager and purchasing agent, Puget Sound Navy Bus Operation, Washington Motor Coach, Bremerton, Wash.

Formerly field engineer, Wright Aeronautical Corp., Paterson, N. J., **HARRIS C. HUG** is now lead engineer, preliminary design, Boeing Aircraft Co., Seattle, Wash.

A student member at Fenn College, Cleveland, **MAX A. LUEHRS** is also process engineer with Hahn Associates Corp., Cleveland.

Formerly tool design engineer, Western Electric Co., New York City, **HERMAN W. BAER** has joined Mergenthaler Linotype Co., Brooklyn, N. Y., as mechanical engineer.

BLAKE REYNOLDS has been named technical assistant, Texaco Development Corp., New York City. He was previously

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associated with Lawrance Aeronautical Corp., Linden, N. J., as executive engineer.

Formerly aeronautical engineer with Grumman Aircraft Engineering Corp., Bethpage, L. I., N. Y., **U. G. BALDASSARRI** is now a private in the U. S. Army.

ARTHUR BAITZ is now control engineer with Dan Mason & Co., Buffalo, N. Y. He was formerly test engineer with Sterling Engine Co., same city.

JOHN W. RIX has left the employ of Cessna Aircraft Co., Wichita, Kans., where he was manufacturing engineer, to join Beech Aircraft Corp., same city, as staff engineer in a production advisory capacity.

Formerly chief pump engineer, Chandler-Evans Corp., South Meriden, Conn., **EUGENE LAAS** now holds the same position with Chandler-Evans, Division of Niles-Bement-Pond Co., West Hartford, Conn.

JOHN E. FLICKINGER has been named project engineer of American Airlines, Inc. He formerly was service engineer, Douglas Aircraft Co., Inc., Santa Monica, Calif.

WALTER F. ISLEY, formerly research test engineer with Briggs Mfg. Co., Detroit, is now test engineer, Continental Aviation & Engineering Corp., same city.

EDWARD A. SLINDEE, who had been junior engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind., is now test engineer with International Harvester Co., Tractor Works, Chicago.

Previously assistant chief draftsman, Turbo Engineering Corp., Trenton, N. J., **ALBERT C. SODERLUND** is now affiliated with the Associated Aeronautical Engineering & Research Corp., same city, as designer.

PAUL H. WINTER has been named chief engineer of Hahn Motors, Inc., Hamburg, Pa. He was formerly production manager of Rogers Diesel & Aircraft Corp., New York City.

ROBERT C. POLKOPH, Wright Aeronautical Corp., Paterson, N. J., has been promoted from flight project engineer to installation engineer.

Formerly rubber consultant, Office of the Chief of Ordnance-Detroit, **FRED L. HAUSHALTER** is now development engineer with the Baldwin Rubber Co. of Pontiac, Mich.

Formerly senior test engineer with Wright Aeronautical Corp., Cincinnati, Ohio, **JAMES K. BALZHISER** is now test engineer in the Tire & Tube Division of the B. F. Goodrich Co., Akron, Ohio.

FRED W. CEDERLEAF has been appointed assistant to the executive vice-president of Borg-Warner Corp., Chicago. He previously was works manager of the Detroit Transmission Division of General Motors Corp., Detroit. Mr. Cederleaf is a past vice-president of the SAE.

Previously carburetor engineer, Dodge Chicago Plant, Division of the Chrysler Corp., Chicago, **F. OSANN, JR.,** has recently been transferred to Chrysler Engineering Division, Highland Park, Mich., where he is employed in the capacity of project engineer.

CHRISTIE BATLAS has joined Westinghouse Electric Corp., Fairmont Lamp Works, Fairmont, W. Va., as industrial designer. He formerly was associated with Goodyear Aircraft Corp., State Model Co., and Model Air Lines, all of Akron, Ohio.

THEODORE E. BOKEMEIER has been named service manager of the Bunting Tractor Co. of Burley, Idaho.

Formerly technical service representative, British American Oil Co., Ltd., Regina, Sask., Canada, **R. T. BLACKMORE** has been transferred to the Calgary branch of the firm where he is technical service supervisor.

Formerly test engineer, Wright Aeronautical Corp., Paterson, N. J., **GENE F. McCONNELL** is now a private in the U. S. Army and is stationed at Fort Myer, Va.

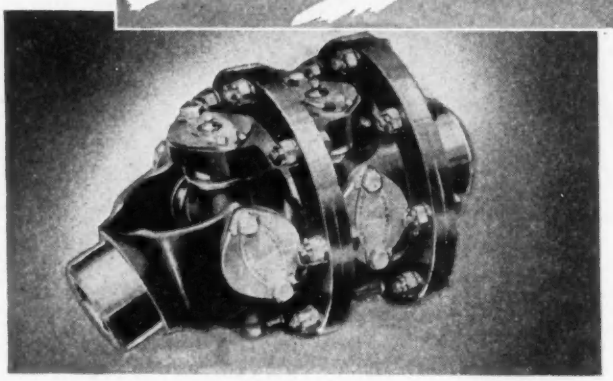
M. W. McMAHAN, Wright Aeronautical Corp., has been transferred from the Cincinnati plant, where he has served for three and one-half years as senior liaison engineer, to the Paterson, N. J., plant, where he has assumed his duties as senior test engineer.

ARTHUR W. BENHAM, JR., is now erection engineer with Reading Steel Products, Reading, Pa. He was formerly engineer with American Airlines, Inc., L. I., N. Y.

Formerly a student member at Purdue University, West Lafayette, Ind., **CONRAD N. REUTER** is now associated with the Chrysler Corp., Detroit.

STEPHEN SCOTT has left the White Motor Co. to join Mack-International Motor

Stamina



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Truck Co., Dallas, Tex., as wholesale salesman. Making his headquarters in Dallas, he will cover territory which includes west Texas and all of New Mexico.

Formerly in the TX engineering department of the Toledo Division of Packard Motor Car Co., **I. T. ROSENLUND** is now experimental project engineer in the Aircraft Engine Division of the same company.

HENRY B. THOMSON, who had been project engineer, Hydraulic Coupling Division, American Blower Corp., Detroit, is now assistant general manager of Schieber Mfg. Co., same city.

Until recently supervisor of engineering and manufacturing, Standard Steel Spring Co., Armour Plate Division, Detroit, **R. D. BUICK** is now associated with the C. M. Hall Lamp Co., same city.

CHARLES L. BLOCK has joined the Ford Motor Co., Dearborn, Mich., as project engineer in the experimental engine test department. He was formerly chief liaison engineer, Wayne Division, Bendix Aviation Corp., Wayne, Mich.

Previously associated with Thompson Products, Inc., Cleveland, as project engineer, **HOMER D. BARTO, JR.,** is now an engineer with the Clark Dickerson Lumber Co., Reed City, Mich.

JOSEPH N. ULMAN, JR., is now associated with the Ethyl Corp., Research Laboratories, Detroit, Mich. He had been head of the engineering test section, General Motors Proving Ground, Milford, Mich.

E. W. FULLER has joined American Airlines, Inc., L. I., N. Y., as facilities planning engineer. He was formerly aviation specialist, U. S. Navy, Bureau of Aeronautics, Washington, D. C.

Formerly airlines engineer, Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn., **F. M. MORENCY** is now affiliated with the M. A. Ford Mfg. Co., Inc., Davenport, Iowa.

RAYMOND H. STOCKARD has been named assistant to the production manager, American Bosch Corp., Springfield, Mass. He was formerly project engineer with Wright Aeronautical Corp., Paterson, N. J.

WILLIAM F. GITTLER has been appointed staff supervisor in charge of production planning and control, John A. Roebling's Sons, Trenton, N. J. He had been production planning manager, Jacobs Aircraft Engine Co., Plant No. 2, Pottstown, Pa.

Formerly plant layout and equipment engineer, J. I. Case Co., Rock Island, Ill., **WESLEY S. ROPER** is now foundry layout engineer with Beardsley & Piper Co., Chicago.

BERNARD F. KLEIN is now sales engineer with Petroleum Advisers, Inc. He was chief of the fuels and lubricating section, U. S. Army Signal Corps Laboratory, Fort Monmouth, Red Bank, N. J.

LAWRENCE W. FISCHER has been elected a vice-president of the Timken-Detroit Axle Co., Detroit. He was formerly executive engineer of that organization.

Formerly test engineer, Wright Aeronautical Corp., Service Department, Paterson, N. J., **IKE KIBBE** is now an engineer in the Automotive Division, Research and Development Laboratories, Socony-Vacuum Oil Co., Inc., Paulsboro, N. J.

STANLEY M. GRABOWSKI, who had been with Fleetwings, Division of Kaiser Cargo, Inc., Bristol, Pa., is now body draftsman with Mack Mfg. Co., Allentown, Pa.

Until recently resident engineer, Evansville Ordnance Plant, Chrysler Corp., Evansville, Ind., **B. W. BOGAN** has been transferred to the Highland Park, Mich., branch of the corporation where he is head of the radiator department.

ROBERT CRAMER, JR., assistant chief engineer, Nordberg Mfg. Co., Milwaukee, Wis., was elected a director of the Engineers' Society of Milwaukee at a meeting of the Society on Oct. 17.

Previously production planning department manager, Ingersoll Steel & Disc Division, Borg-Warner Corp., Kalamazoo, Mich., **JOHN W. F. READ** is now materials manager, GM Overseas Operations, Antwerp, Belgium.

FRANCIS H. EMERSON, who is an associate professor of mechanical engineering at the College of Engineering, Wayne University, Detroit, will serve, on an exchange professorship, as professor of me-

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chanical engineering at the University of Arizona. Mr. Emerson will return to his permanent position in June, 1946.

Formerly design engineer, Briggs Mfg. Co., Vernor Plant, Detroit, **CLARENCE E. FRANK** is now with General Motors Corp., Product Study, Special Problems, Detroit, in the capacity of senior project engineer.

JOSEPH S. FRANCIS has formed the Francis Co. of Chicago, a firm of consulting engineers specializing in mechanical engineering. Mr. Francis had been the owner of Francis & Cappelle of Chicago.

Formerly a student member at Purdue University, West Lafayette, Ind., **EDWIN D. KELB** is now employed by the Eel River Mining Co., Indianapolis, Ind., as an engineer.

FANTIN IAVELLI has become a draftsman in the layout and design section of Graham-Paige Motors Corp., Detroit. Mr. Iavalli had previously been design engineer with Briggs Mfg. Co., same city.

Formerly with National City Lines, Inc., Chicago, **BENSON M. LARRICK** is now affiliated with Los Angeles Transit Lines, Los Angeles.

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W. G. GERNANDT has joined Graham-Paige Motors Corp., Detroit, as chassis engineer. He was previously chief engineer, Motor Experimental Division, Briggs Mfg. Co., same city.

Formerly test engineer with Wright Aeronautical Corp., Paterson, N. J., **GRANT E. SCOTT, JR.**, is now associated with Allis-Chalmers Mfg. Co., West Allis, Wis.

WILLIAM WADDELL has joined Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn., as a designer. He had been a specification engineer with the Studebaker Corp., South Bend, Ind.

After serving for four years as a major in the USAAF, **D. W. SMITH, JR.**, has resumed his civilian activities as a special representative for the Evans Products Co., Detroit.

W. W. KOVALICK, Firestone Tire & Rubber Co., has been transferred from the Atlanta, Ga., plant, where he was division engineer, to the Firestone Steel Products Co., a division of the Firestone organization, Akron, Ohio, where he is serving as assistant master mechanic.

N. G. KOPPINGER is now supervisor of die engineering of the Briggs Mfg. Co., Detroit. He was formerly chief engineer of the Turret Division of the same company.

Formerly project engineer, Dodge Chicago Plant, Division of the Chrysler Corp., **LEONARD J. KOCH** has joined Jack & Heintz, Inc., Cleveland, where he holds a similar position.

JOSEPH KUCHAR has been elected president of the Kuchar Track Wheel Co., Chicago. Mr. Kuchar was previously vice-president and chief engineer of the Athey Truss Wheel Co., same city.

OTTO LESSING has returned to his civilian position of petroleum engineer with the Standard Oil Co. of N. J. Mr. Lessing has been on a four-year military leave of absence from the Standard Oil Co., and has been serving as a lieutenant colonel with the USMC.

WILLIAM H. MASHINTER has been elected a director of the Mashinter Research Foundation, Chicago. He was formerly a consultant specializing in fuel injection.

SPENCER W. DEMING, who had been metallurgical process engineer, P & W Aircraft Corp. of Mo., Kansas City, Mo., has joined Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn.

EARL P. BARTHOLOMEW has been named superintendent of equipment, Kilpatrick Bakeries, San Francisco. He formerly was associated with Pacific Highway Transport, Seattle, Wash., as superintendent of maintenance.

Previously supervisor, AAF Engine Test Inspection, U. S. Army Air Forces, Melrose Park, Ill., **OSWALD L. SARAP** is now verification test engineer, Air Technical Service Command, Wright Field, Dayton, Ohio.

ROBERT A. HEATH, who had formerly been development engineer, International Harvester Co., Fort Wayne, Ind.,

has become a junior engineer with the Oldsmobile Division of General Motors Corp., Lansing, Mich.

Formerly a student member at the University of Wisconsin, Madison, Wis., ROBERT W. FLEMING is now serving in the USNR.

RICHARD F. CORWIN is now a partner in the firm of R. A. Corwin & Son, East Hampton, L. I., N. Y. Before forming this company, Mr. Corwin was assembly and repair officer, U. S. Navy, Mostin Field, Navy Yard, Philadelphia.

F. A. GRABARCZYK, who had been mechanical engineering draftsman with the Tracksan Co., Milwaukee, Wis., now has a similar position with the Bostrom Mfg. Co., same city.

Formerly a student member at the University of Minnesota, Minneapolis, Minn., KENNETH VanBEEK is now a midshipman in the USNR.

JAMES O. KING has joined the Bear Mfg. Co., Rock Island, Ill. He was formerly senior engineer, Wright Aeronautical Corp., Plant No. 7, Woodridge, N. J.

OBITUARIES

James A. Moyer

James A. Moyer, 68, state director, University Extension, Commonwealth of Massachusetts, Boston, died Nov. 29.

Prior to his association with the University Extension in 1915, Mr. Moyer served as director of the Engineering Experimental Station and of the University Extension Department of Pennsylvania. He attended Drexel Institute in Philadelphia for one year and Harvard University from which he received the degrees of B. S. and M. A., in 1899 and 1904, respectively. While working toward his Master of Arts degree in 1904, Mr. Moyer also served with the University as an instructor in engineering. Later he joined Westinghouse, Church, Kerr & Co., New York City, as an engineer. Mr. Moyer had been an expert and the author of numerous papers on steam turbine engineering and powerplant testing.

Mr. Moyer, SAE Councilor for the term 1929-1930, was the first chairman of SAE New England Section in 1921-1922.

Woodward Burke

Woodward Burke, director of flight research, McDonnell Aircraft Corp., Lockland, Ohio, died Nov. 1 in the crash of an experimental jet-propelled airplane. Mr. Burke was 31 years old.

Just before his plane crashed, he turned on the movie camera in the plane and the difficulties he encountered and his near solution of them have been recorded. A noted Navy and Army Air Forces test pilot, Mr. Burke joined McDonnell Aircraft Corp. in 1944, just after leaving Brewster Aeronautical Corp. Shortly after his graduation from Purdue University in 1935, he joined the U. S. Navy, with which he served until 1939, when he joined the Brewster organization.

Active in St. Louis Section affairs, Mr. Burke was elected to junior member grade in 1936.

Dr. Porter Adams

Dr. Porter Adams, former president of Norwich University and an aeronautics pioneer, died Dec. 5 at his home in Boston after a long illness. Dr. Adams was 51 years old.

One of the organizers in 1922 of the National Aeronautics Association, Dr. Adams was president of the Association in 1926. As president, he was credited with making the Lindbergh flight to Paris possible. He became president of Norwich University in 1934 and served in that capacity for six years until ill-health forced him to resign. He also maintained a laboratory at Thetford, Vt., where he conducted aerodynamic studies.

Dr. Adams received his early education in Boston and at the University of Redlands in California. He was a special student in the first aeronautical engineering course at M.I.T., from which he was graduated in 1914.

William G. Roby

William G. Roby, president of the Cinch Mfg. Corp., Chicago, died recently at the age of 62.

A native of Detroit, Mr. Roby joined the Cinch Mfg. Corp. in 1910 and remained

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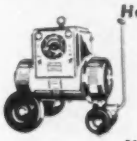

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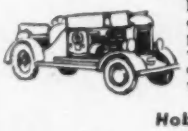

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with that company until his death. The company specializes in the manufacture of metal stampings for automobiles.

Mr. Roby was elected to associate member status in 1926.

Albert R. Reid

Albert R. Reid, chief engineer of the Auto-Lite Battery Corp., Niagara Falls, N. Y., died recently. Mr. Reid was 57 years old.

Mr. Reid, a native of Buffalo, N. Y., attended Canisius College and the University of Buffalo, from which he was graduated in 1912. Shortly after his graduation he joined the U. S. Light & Heat Corp. as a chemist in the testing laboratories. Through research and development work he was placed in charge of process and plant control processes. In 1921 he was appointed chief chemist in charge of design and development of the company. Later he joined the Auto-Lite organization, with which he remained until his death.

D. Heber Geiger

D. Heber Geiger, sales manager of the Parish Pressed Steel Co., Reading, Pa., died Sept. 26 at the age of 57.

Mr. Geiger joined the Parish company, then the Parish Mfg. Corp., in 1910, shortly after attending Drexel Institute in Philadelphia, where he studied mechanical engineering. Before becoming sales manager of the firm, Mr. Geiger served as a tool designer, sales engineer, and in many other capacities.

He was elected to member grade in the Society in 1925.

George A. Huhn III

George A. Huhn III, an automotive engineer with the Sun Oil Co., Marcus Hook, Pa., died recently of a heart condition after a short illness.

Mr. Huhn joined the Sun Oil firm in 1938 and was placed in charge of complaints, tuning and correcting the timing of cars, and also of training salesmen and operating service stations. Prior to that he had organized his own firm, specializing in the repairing and selling of Chrysler Plymouth cars. He served in the U. S. Army in 1917 and 1918 in charge of a motorcycle brigade and later as a flying cadet.

Mr. Huhn was elected an associate member of the Society in 1939.

Earle L. Young

Earle L. Young, formerly factory manager of the Laminated Shim Co., Inc., L. I., N. Y., died recently at the age of 53.

Mr. Young, who was retired at the time of his death, joined the Laminated Shim firm in 1920, shortly after his honorable discharge from the U. S. Army. While with this firm he designed tools and special machinery for which he received patents assigned to the company. He had been in complete charge of all products manufactured, cost estimating, personnel supervision, and machinery design. As a lieutenant in the Motor Transport Corps in World War I, Mr. Young was responsible for the specification and procurement of repair and spare parts for motor vehicles and machines and for the maintenance of them.

Mr. Young joined the Society in 1920.

Thomas B. Sharar, Jr.

Lt. (jg) Thomas B. Sharar, Jr., USNR, was killed in action June 16 while serving as assistant engineer aboard the U. S. S. Twiggs in the Asiatic Area.

Before joining the Navy in 1942, Lieutenant Sharar was a junior analytical engineer with the Lycoming Division of the Aviation Corp. in Williamsport, Pa. Early in 1945 he was promoted from an ensign to the rank of lieutenant (jg). Prior to going into active duty in the Navy, he attended the Diesel Engineering School at State College, Pa. He was graduated from Michigan State College in 1940 with a degree of B. S.

Boyce Nelson

Boyce Nelson, bulk sales representative, Sinclair Refining Co., Fort Worth, Tex., was killed instantly in an automobile collision Sept. 4. Mr. Nelson was 44 years old.

Since 1927, his work had been exclusively with grease manufacturers, independent refiners, and large jobbers of lubricating oils and greases. His work for Sinclair during this period was the sale of basic stock and technical oils. Prior to his association with Sinclair, Mr. Nelson was connected with Swift & Co. of Oklahoma City, Okla.

Mr. Nelson became an associate member of the Society in 1944.

EVERETT R. REDFORD is now a partner in the firm of Aero Automobile Engineering, Detroit. He had been staff master mechanic, Nash-Kelvinator Corp., same city.

W. E. MEYER has recently become affiliated with the Research Engineering Corp., New Haven, Conn., as chief engineer.

Formerly a student member at the University of Colorado, Boulder, Colo., **LOUIS KUH** is now employed there as junior research engineer.

HARLIE H. HICKS has joined GMC Truck & Coach Division, General Motors Corp., Pontiac, Mich., and is serving in the special assignments service department. He was formerly assistant service manager, Allison Division, General Motors Corp., Indianapolis, Ind.

RAY SOPHIAN, formerly field engineer with Wright Aeronautical, Ltd., Los Angeles, Calif., is now sales engineer with the General Controls Co., Glendale, Calif.

Formerly director of supply, motor transport section, British Ministry of Supply, Washington, **HENRY B. HOBSON** is now the New York City export representative of the Four Wheel Drive Auto Co., Clintonville, Wis.

F. GERARD LAKE has recently joined the M. W. Kellogg Co., Jersey City, N. J., as a design and development engineer. Mr. Lake formerly held the position of design engineer with the E. W. Bliss Co., Brooklyn, N. Y.

W. S. RAINVILLE, JR., has become affiliated with the American Transit Association, New York City, as director of research. Before joining the ATA, he was director of the research department of New Orleans Public Service, Inc., New Orleans, La., and director of the Equipment & Research Division, Highway Transport Department, Office of Defense Transportation, Washington, D. C.

Formerly chief test engineer, Pratt & Whitney Aircraft Corp. of Mo., Kansas City, Mo., **FRANK J. HAHN** is now a design engineer with the Standard Oil Co. of Ind.

JOSEPH S. BRODY, a flight engineer with the USAAF, is now on terminal leave from the Army, and has made his residence at Des Moines, Iowa.

Previously master mechanic with Fisher tank section of General Motors Corp., Detroit, **ERNEST E. HAMILTON** is now engineer in charge of the development and experimental department of Fisher Body Division of General Motors.

WILLIAM F. STEFFEN has joined the J. I. Case Co., Racine, Wis., as a design engineer working on tractors. He was formerly designer in the engineering department of the Koehring Co., Milwaukee.

JAMES E. P. SULLIVAN, who had been senior aeronautical designer with United Aircraft Products, Inc., Dayton, Ohio, has become a laboratory technician with the Airtemp Division of the Chrysler Corp., same city.

Formerly associated with the Dodge Chicago Plant of the Chrysler Corp. as tool engineer, **ROBERT M. HIRSCH** is now an industrial engineer with the Philco Corp., Chicago.

NEW MEMBERS Qualified

These applicants who have qualified for admission to the Society have been welcomed into membership between Nov. 10, 1945, and Dec. 10, 1945.

The various grades of membership are indicated by: (M) Member; (A) Associate Member; (J) Junior; (Aff.) Affiliate Member; (SM) Service Member; (FM) Foreign Member.

Baltimore Section: Lt. John R. Cunningham (J).

Buffalo Section: Melville Ehrlich (M), Ross G. Hoke (M).

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Canadian Section: R. P. Frey (M), William Munro Gibson (A), Albert Langford Lee (J).

Chicago Section: Irvin L. Alspaugh (M), David Harold Burbidge (A), Gilbert Fritz Carlson (J), D. Paul Fisher (M), Harold Fisher (M), George H. Gruber (A), George Kende (A), R. J. Meinert (A), Harry Albert Pearman (A).

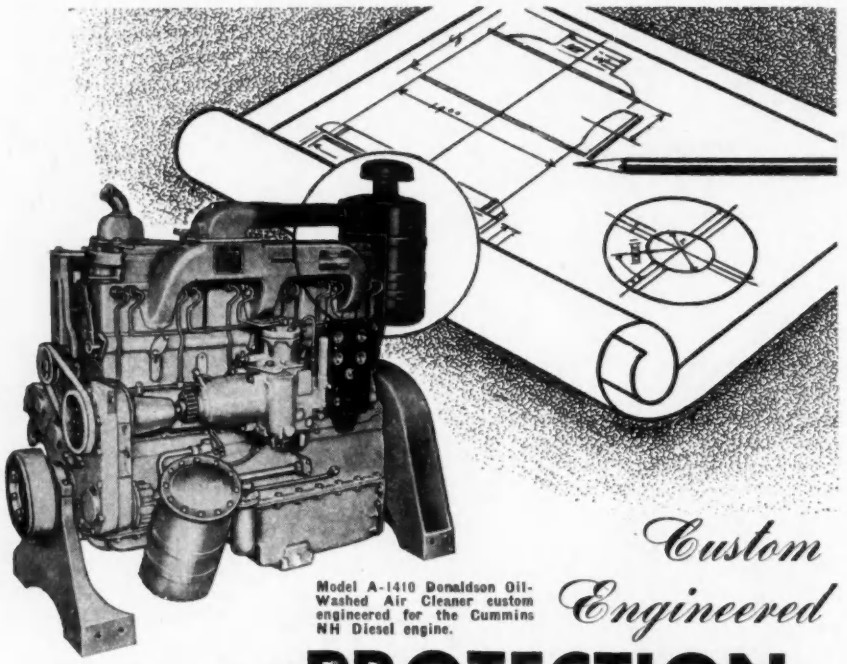
Cincinnati Section: Harold W. Couper (A), G. M. Harper, Jr. (J), Bert S. Mellors (A).

Cleveland Section: William E. Achor (J), Henry C. Barnett (J), George W. Daggett (M), Arthur J. DeLaurier (M), Henry J. Frontroth (A), John James Jacklitch, Jr. (J), W. H. Redhead (A).

Dayton Section: Garthwood R. Taylor (J).

Detroit Section: Charles R. Barrick (SM), Edgar B. Brown (M), Glenn J. Bundy (M), Neff Theodore Dietrich, Sr. (M), Balwant Singh Grewal (M), Harold V. Hansen (M), F. T. Harrington (M), Clarence R. Mallon (J), Dean Alvin Walters (A), Edmund Witzke (M).

Indiana Section: Medard J. Spencer (J).



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Metropolitan Section: Jerome G. Abbott (A), Thorsten Anderson (A), Eldred W. Bemis (A), Earl M. Biehl (A), Philip Cinis (A), Philip Jos. Costa (M), Harold Ferman (A), C. Walter Frankenfield (M), Eugene Halperin (M), O. W. Hinterthur (A), Marcel Piry (J).

Mid-Continent Section: D. P. Thornton, Jr. (M).

Milwaukee Section: Arthur W. Pohl (A).

New England Section: Shiao Pin Loh (J).

Northern California Section: Thomas M. Murray (A).

Northwest Section: Carl N. Klitgaard (M).

Philadelphia Section: John Bowman (A), George A. Witsil (A).

St. Louis Section: Jack J. Goldstien (A), Edmond Siroky (M).

Southern California Section: Francis C. Anderson (A), Philip R. Baus (A), Jack R. Conaway (A), Hayden Forman (A), Frank S. Galpin (A), Albert C. Green (M), Malcolm Stuart Harned (J), David J. Kipp (M), Arthur H. Kuriloff (J), Arthur S. Leonard (M), Miss Helen C. Lowe (J), Capt. Arthur Paul McCabe (SM), Clarence W. McKenzie (A), Leonard E. Miles (M), Lt. Martin N. Olivenstein (J), Warde L. Parker (M), John S. Poplin (A), Eugene V. Reynolds (A), Frank Newell Smith (A), Clarence E. Stafford (J), J. Earl Tober (J), Jack C. Urban (A), Raymond J. Woods (A).

Southern New England Section: Burton Hathaway Albee (J), John W. Mazur (J).

Spokane Group: Charles J. Dow (M), Albert M. J. Pohl (A).

Syracuse Section: DeWitt M. Brownson (M), Frank E. Dellard (M), Richard Steven Lewis (A), Samuel K. Wolcott, Jr. (M).

Texas Section: Claude D. Peebles (M), Fred W. Surber (A).

Twin City Group: Daniel A. Armstrong (M), Senus Harms (A).

Virginia Group: Norwood C. Beland (M), Vernon G. Browning (A), C. Lansing Eubank (A), J. Hensley Foote (A), R. D. Hubbard (M), F. M. Hutcheson (A), Nelson Y. Tennis (A), C. A. Truslow (A).

Washington Section: Thomas William Clavell (M), Carl Hinshaw (SM), Mou-che Liu (FM), Lawrence E. Smithers (SM).

Outside of Section Territory: William C. Bergstrom (A), Paul H. Daily (M), John B. Dydiw (J), Hugh H. Hendrickson (M), Frank B. Quackenboss, Jr. (J).

Foreign: Lt. Louis Aa (FM), Australia; Dennis Coates (J), England; Humberto Mecedo Cheves Ferraz (FM), Portugal; William Henry Lenton (FM), England; Richard Pentony (FM), England; Edgar Wikner Percival (FM), England; William Semmons (FM), England; Frank Shaw (FM), England.

APPLICATIONS Received

The applications for membership received between Nov. 10, 1945, and Dec. 10, 1945, are listed below. The members of the Society are urged to send any pertinent information with regard to those listed which the Council should have for consideration prior to their election. It is requested that such communications from members be sent promptly.

Baltimore Section: Lt. (jg) William H. Clancy, Thomas E. Swartz.

Buffalo Section: John Robert Fogarty.

Canadian Section: Arthur Stewart Bayne, Karl R. Chalmers, John Allan Fyfe, Stephen B. Plummer.

Chicago Section: Raphael Angelini, William Quine Douglass, Andrew G. Forrest, James H. Flynn, Charles R. Eulo, Arthur E. Gibbs, Charles E. Harnach, Robert Anderson Lasley, Frederick Stanley Nowlan, Philip Earl Rinck, Don C. Slamer.

Cincinnati Section: Paul Haines, Ralph R. Lane.

Colorado Group: Elmer John Sellinghausen, Edward Shahinian.

Cleveland Section: James H. Holan, Thomas William Jarrett, James R. Lee, Seymour Lieblein, Eugene R. Moyes, Everett D. Mumaw, Ralph J. Poole, Ralph S. Shogren, Joseph C. Topping, Jack M. Wagner, William Boyd Watterson.

Dayton Section: Frank A. Bailey, Robert S. Goebel, Arnold L. Johnson, John Cephas Martin.

Detroit Section: John V. Barnes, Arthur B. Billet, J. Arthur Brown, Felix Carl Bugnell, Harry W. Dale, Raymond O. Doss, William Harris Downer, Capt. G. H. Esch, John W. Fedack, James Robert Ferguson, John Erwin Henn, Richard L. Hinch, Robert King Hirchert, Charles F. Hoopes, Lawrence F. Hope, John Cavett Houston, Christopher Joseph Hubbard, W. L. Klingman, Clarence F. Kramer, Melvin Eugene LaVerne, Prentiss B. Leffler, Bennie D. Mirkin, R. H. Mitten, Nelson S. Mosher, William Mussnig, Frank A. Newberry, William E. Rigley, Nathan H. Schermer, Walton H. Schuh, Walter D. Speicher, Ralph A. Wilhelm.

Hawaiian Section: Walter Roy Blake, A. J. Hebert, Mortimer Hitter Moores, Carleton Henry Morrison, F. E. O'Rear, Robert D. Purves, Bruce Calvert Rathbone-Deaton, Ben L. Silverman, Yale E. Smith, E. J. Stirniman.

Indiana Section: Rehmert W. Clark, Gene A. Cormany, John B. Hiday, Paul Hubert Rogers, James Earl Yingst.

Metropolitan Section: Robert A. Ackerman II, Lt. Robert C. Allen, Philip Alper, John M. Barstow, Henry Berman, Richard A. Brown, Robert Daews, Irvin W. Folk, Charles B. Gale, Fred R. George, Ralph Hopkins, Frank John Kinder, Arthur W. Lewis, Paul Liebow, Herbert Mandelbaum, Lt. (jg) Chester M. Metra, Charles J. Milesi, David H. Moore, Jr., Frank N. W. Moy, Anthony Peter Noto, Gustave Joseph Rauschenbach, Neilson F. C. Tomlinson, Christian M. Vogrin, Peter Richard Weihsmann, Orrin E. Watson, Frank H. Woodman.

Milwaukee Section: Clarence E. Borkenhagen, Paul Schwartz, Ralph Earl Williams, Alfred A. Wridt, Jr.

New England Section: Thomas L. Callahan, James Francis Hoey, Jr., Urban J. Long, Edward J. Malkin, Charles H. Newton, Otis W. Rose, Clifton R. Sargent.

Northern California Section: Sydney R. Calish, Jr., George J. Harris, J. M. Scott, William Eugene Shafer.

Northwest Section: Joseph C. Cassidy, C. H. Erlandson, Clifton C. Stevens, Bernard J. Uhlir.

Oregon Section: William S. Hood.

Peoria Section: Woodrow P. Kimsey, Ivan R. Lamport, Alfred W. Sieving, Donald K. Strohschein.

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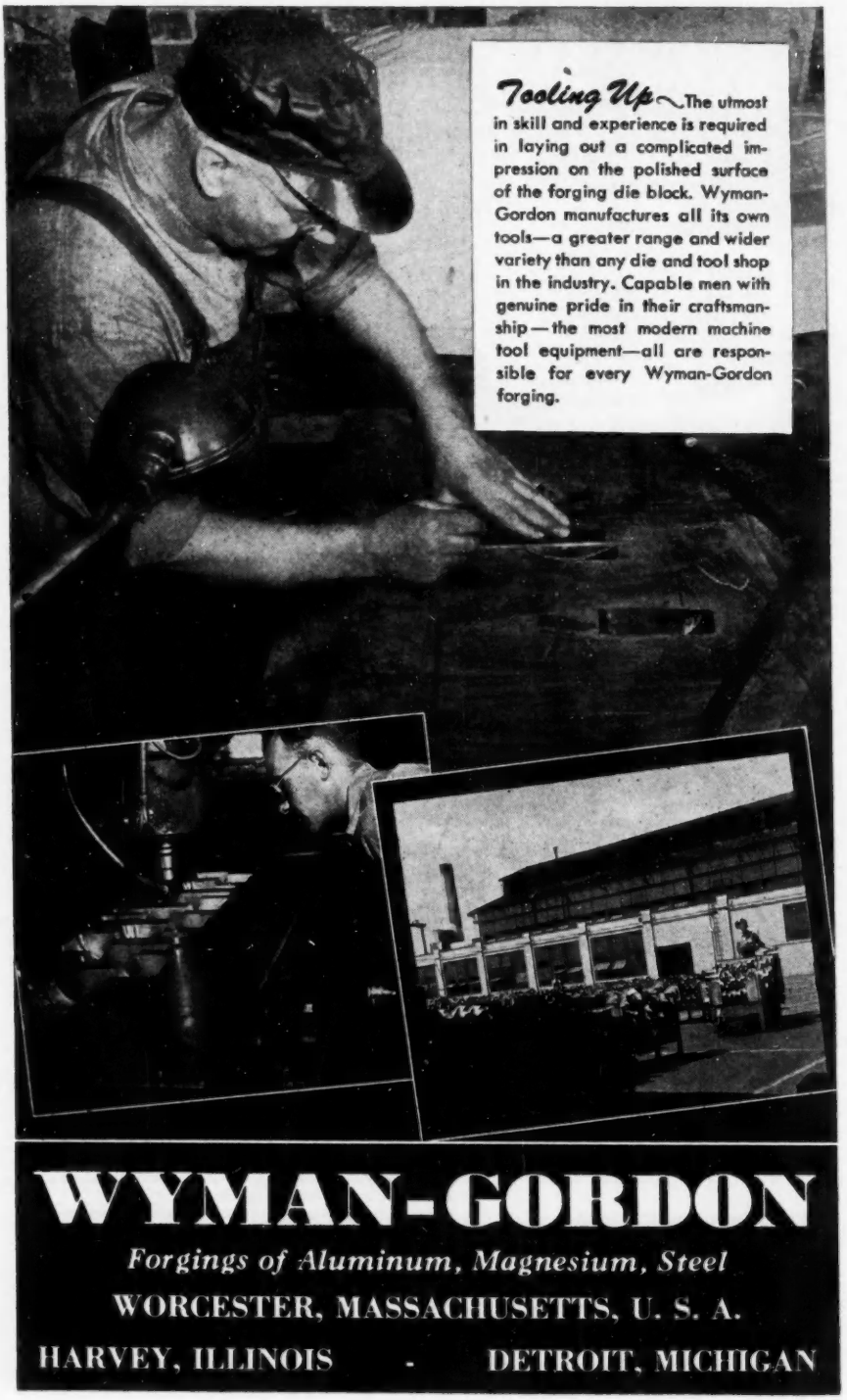
Foreign: Leonard Ainsley, England; Benjamin King, England; Jan Soeten, Holland; Jaime Alberto Vendrell, Buenos Aires, Argentina.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Air Transport Engineering

cont. from p. 34

ferent airlines, and sometimes different routes of the same airline, require a complete change in location of specific crew members or the elimination of certain crew stations on the control deck.

Basic requirements stated were:

Establishment of relative distances between pilot and co-pilot; relation of pilot and co-pilot to the instrument panels and other necessary controls which they operate; and the location of the flight engineer's, radio operator's, and the navigator's stations in relation to each other's and in respect to instruments to avoid interferences.

He proved to be an ardent champion of better visibility, lighting, ventilation, and simpler instrument panels, and declared that vibration must be reduced and the noise levels of control cabins are far too high. These disturbances, he reported, cause great fatigue of crew members who because of the very nature of their work and responsibilities, should be protected from further strains.

It developed, furthermore, that crew members sustain many an injury from protruding parts and sharp corners of equipment in the control cabins. More padding and providing greater freedom of movement were among the requests he submitted for study and action.

Safety to passengers and crew in the event of forced landings in the sea kept another session in discussion lasting overtime. Despite the excellent rescue work done by the U. S. Coast Guard, and some of the spectacular accomplishments of the Army Air Forces and Navy flight personnel, the subject is one requiring the best engineering brains that can be marshaled for its solution, it was disclosed.

Intense interest was shown in airport design. At a time when millions of dollars are being spent to build new airports and rebuild and enlarge others, and while proposals for the expenditure of even greater amounts of public funds are being widely discussed, operation engineers, equipment manufacturers, and architects discussed the fundamentals of this problem. So complex are the requirements that, again, cooperation of all elements of the air transport business, architects, and materials handling experts was called upon to join in giving the United States the best facilities on earth.

One speaker, an architect with a great deal of airport construction experience, held that passenger and cargo facilities must be separated and kept apart. So great has been the growth of air traffic, and so huge are even the conservative estimates of expansion, that efficiency can be achieved only

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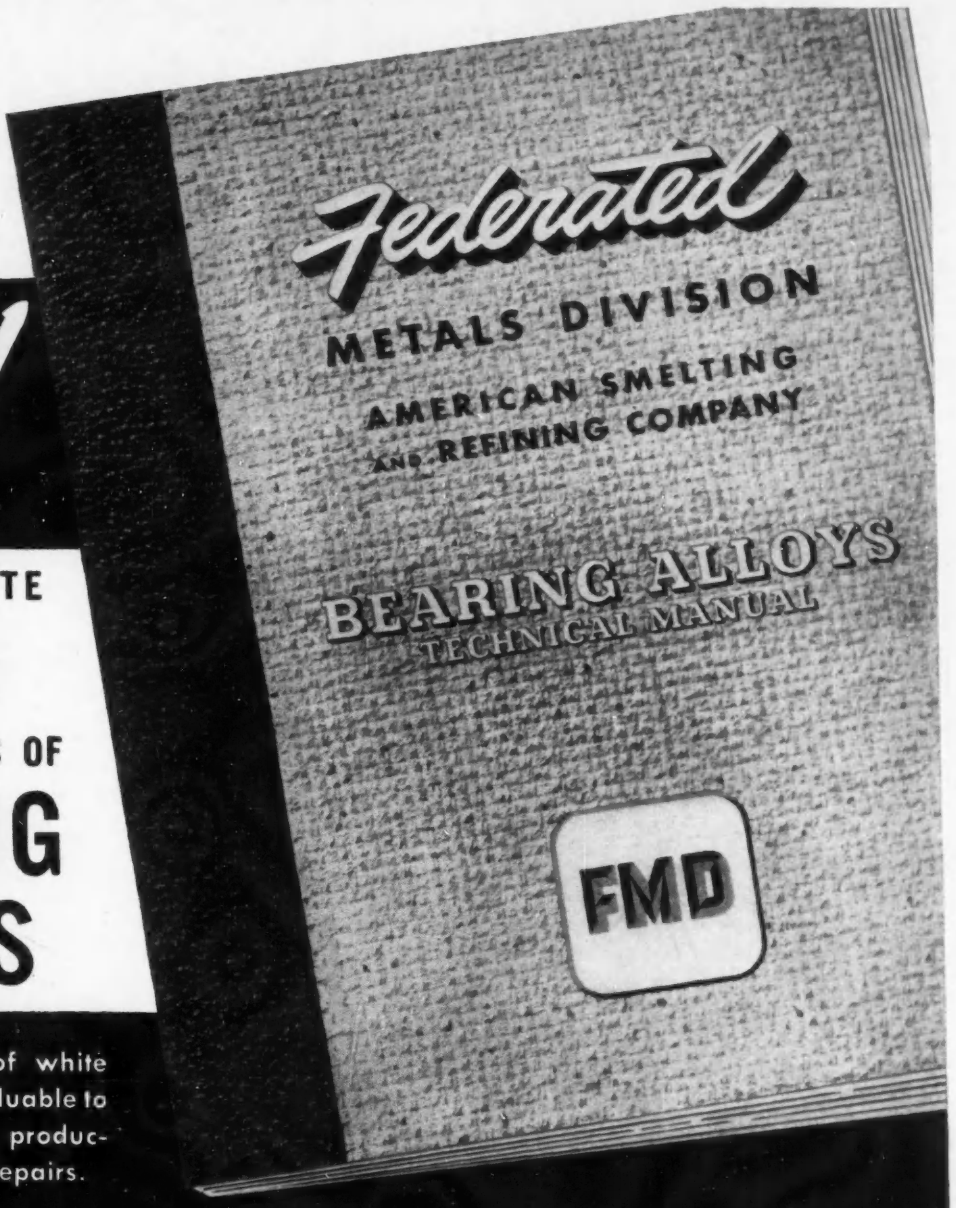

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by hewing close to the line of this requirement.

He pointed out that because of the rapid growth of the business today, this point had been overlooked at many airports.

Again, as characteristic of previous SAE air transport meetings, the problems of loading and unloading, and of servicing aircraft, came in for careful study and animated discussion.

Three speakers concentrated their attention on cargo handling, and four others touched upon the problem as an important factor, while scores of engineers discussed various phases in specific terms at other sessions. Keeping the airplanes in the air for as much of their life as possible was the keynote at all of these discussions.

The Army, Navy, representatives of airlines, aircraft, and equipment manufacturers all agreed that concerted effort is needed to reduce the costly delays in loading and unloading cargo planes. Among the experiences offered was a complete explanation of fork truck-belt loading-manual developments found successful by one airline.

A proposal was made that the natural incline of a parked airliner be used by rearranging the control cabin to permit loading at the front end, and to unload at the tail end of the ship. By arranging the cargo bins, loaders could be working at the forward end, and unloaders aft and thus confusion could be held to a minimum. Some startling figures of time saved—such as from 17 to 3½ min.—were disclosed.

Preloaded containers, including refrigerated units, were described by another speaker. Glass materials and spun glass pads for insulation have become standard on one major airline replacing heavier refrigeration bags that had been used previously.

Ingenious designs of loading trucks and full scale automotive trucks were shown. Monorail systems were offered as the solution in some airports, while another speaker showed a scale model of a device consisting substantially of a number of cradles, together with an elevator platform device, to load and unload these containers.

Two Schools of Thought

Clearly two schools of thought in respect to passenger comfort were delineated throughout the session. In general, the operators and engineers present thought the current standards were adequate, at least until competition indicated increased passenger comfort. However, a vigorous minority believed that luxuries should be increased to assure heavy passenger schedules in the post-war era.

A physician, for example, enthralled his audience with a careful analysis of the passengers' psychological considerations, and he showed how the interior decorator, colorist, and artist have an important role in helping to design the passenger airliner of tomorrow.

Even with the pressurized cabin of tomorrow's super stratoliners, interior decorating and the proper choice of colors, materials, and design of seats and other facilities will be important, he believes. Again the question of noise and vibration, the necessity for eliminating protuberances and sharp corners, and a plea for easier movement of passengers, were called to the attention of the operators, airplane manufacturers, and equipment builders. He found agreement with earlier speakers who had stressed these and other points for the comfort of crew members.

Another speaker went deeply into the question of adequate lighting of interiors, both in respect to the control cabin and the passenger space. He envisioned fluorescent lighting as soon as the engineers in that field have equipment which does not cost too much in terms of weight. Lighting should be indirect, and the range in surface brightness should be kept, he believes, as close to 10 to 1 as possible.

Maintenance considerations came in for a careful analysis, one author emphasizing the importance of rapidly servicing the requirements of passengers *en route*. This consideration, he said, should be kept in mind while a prospective design is still on the drawing boards, because excessive costs can gorge profits unless furnishings and equipment which can be kept in good condition are chosen with an eye to continuing costs.

All papers presented at this SAE National Air Transport Meeting will appear in a later issue of the *SAE Journal* either in *full* in the Transactions Section or as digests.

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